

LEVEL: Year 6	CONTENT: Measurement	FOCUS: Converting units of Length
In the Classroom		
<p><b>PURPOSE</b></p>	<ul style="list-style-type: none"> <li>• Develop a clear definition of length and provide examples of when it is used</li> <li>• Recognise that the standard unit for length is the metre</li> <li>• Explain the relationship between metres, centimetres, millimetres and kilometres</li> <li>• Recognise and explain the connection between place value (including decimals) and the metric system</li> <li>• Convert between mm, cm, metres and km and explain the strategy used</li> <li>• Accurately use measuring tools, such as rulers and tape measures to find the length of various objects</li> <li>• Make comparisons between different measures and explain their relationship</li> </ul>	
<p><b>INTRODUCTION</b></p>	<p>Discussion about measurement. What is it? When do we use it? What are the ways we measure? What are the standard metric units? Why is special about the metric system? How do we convert between different measurement units?</p>	
<p><b>WARM-UP</b></p>	<p>Show students a 30 cm ruler. How long is this? Is it in fact 30 cm long? Why is it that long anyway? How can we check?</p>	
<p><b>EXPLICIT TEACHING &amp; LEARNING</b></p>	<p><b>How long is a foot?</b> Historically, the human body has been used to provide the basis for units of length. People would use their hands, feet and digits to help them estimate, measure and compare lengths. Your task is work with a partner to choose the appropriate measurement unit and then measure the following:</p> <ul style="list-style-type: none"> <li>• Width of your little finger (pinky finger)</li> <li>• Width of your hand</li> <li>• Length of your foot</li> <li>• Length of your forearm (inner elbow to your wrist)</li> <li>• Your height from under your arm to the ground</li> <li>• Length of a large step</li> <li>• Length of a standing jump (no run ups – stay still and jump forwards)</li> </ul> <p>Convert the measurements you have collected to mm, cm, metres and kilometres.</p> <p><b>Challenge</b> Look at the measurements you have collected, what do you notice about them? Are any of the measurements similar? What is the relationship between these measurements and other familiar measurements? How can you use what you have discovered to help you with estimating in the future?</p>	
<p><b>DISCUSSION/KEY QUESTIONS</b></p>	<ul style="list-style-type: none"> <li>• What is the metric system? How is the metric system related to place value?</li> <li>• What is length? What is a definition for length? How do we measure length?</li> <li>• What are different tools we use to measure? How do we use these tools accurately?</li> <li>• What is the standard unit for length? What are the related units?</li> <li>• What is the relationship between the units, e.g. 1 cm and 1 mm?</li> <li>• How can we convert between the units in order to compare size?</li> <li>• Can ratios help us to better understand the relationships between the measures?</li> <li>• How can we use ratios to help us convert between measures?</li> </ul>	
<p><b>DELIBERATIVE PRACTICE</b></p>	<p>The focus of this activity is to find out what students know and understand about length and the metric system. Are students able to identify the standard unit for length (metres) and the relationship between metres and other measures, e.g. mm, cm and km? Do students understand the ten times bigger/smaller concept or do students simple apply a rule such as “move the decimal point” without truly understanding what this means?</p>	
<p><b>REFLECTION</b></p>	<p>By knowing common measures, such as the length of one’s hand or large step can help us to predict length in the future. It is important that student understand the relationship between the measurements (e.g. mm and cm, etc.) rather than simply applying a rule to convert between them. Allow time for students to complete the EXIT PASS and collect.</p>	
<p><b>RESOURCES</b></p>	<p>30 cm rulers Tape measures</p>	

Curriculum Connections	
<b>CONTENT</b>	<p><b>NSW Syllabus Mathematics K-10 – Stage 3.2</b>  <b>Length 2</b>                      Connect decimal representations to the metric system (ACMMG135)</p> <ul style="list-style-type: none"> <li>recognise the equivalence of whole-number and decimal representations of measurements of length, e.g. 165 cm is the same as 1.65 m</li> <li>interpret decimal notation for lengths and distances, e.g. 13.5 cm is 13 centimetres and 5 millimetres</li> <li>record lengths and distances using decimal notation to three decimal places, e.g. 2.753 km</li> </ul> <p>Convert between common metric units of length (ACMMG136)</p> <ul style="list-style-type: none"> <li>convert between metres and kilometres</li> <li>convert between millimetres, centimetres and metres to compare lengths and distances</li> <li>explain and use the relationship between the size of a unit and the number of units needed to assist in determining whether multiplication or division is required when converting between units, e.g. 'More metres than kilometres will be needed to measure the same distance, and so to convert from kilometres to metres, I need to multiply' (Communicating, Reasoning)</li> </ul>
<b>WHAT CAME BEFORE</b>	Students will have a basic understanding of length but may think that length is different from perimeter or width or height. They will know of standard units such as cm and metres, but may not understand the relationship between them, or be aware of how to convert between them without applying a formula.
<b>WHAT COMES NEXT</b>	Being able to recognise the unit being used to measure and being able to convert between units is an important skill going forward. Often worded problems will use a range of different measurement units, or require the solution to be given in say metres, even though some of the measures may have been given in centimetres. Students need to understand the relationship between the units and the link between the metric system and decimal numbers. Applying a rule, like “move the decimal point” does not help to highlight the relationship between the units. It is much better to use ratios to help compare and convert different measures. Ratios are in the Stage 4 syllabus.
<b>VOCABULARY</b>	Measurement, size, length, perimeter, width, height, diameter, circumference, long, distance, metric, place value, decimals, ten times bigger, ten times smaller, convert, compare, ratio, relationship
<b>MISCONCEPTIONS</b>	It is important to check if students truly understand how to accurately use and read measuring tools such as rulers and tape measures. Near enough is not good enough, particular when it comes to accurately measuring length, say in the construction industry. Asking students to explain how these tools are used and what the different graduations on the tool represent should help eliminate any misconceptions.
<b>WHAT PROFICIENCIES ARE TO BE UTILISED?</b>  Understanding Fluency Problem Solving Reasoning Communicating (NSW) Justifying (NSW)	<p><b>Year 6 (Australian Curriculum)</b>  <b>Understanding</b> includes describing properties of different sets of numbers, using fractions and decimals to describe probabilities, representing fractions and decimals in various ways and describing connections between them, and making reasonable estimations  <b>Fluency</b> includes representing integers on a number line, calculating simple percentages, using brackets appropriately, converting between fractions and decimals, using operations with fractions, decimals and percentages, measuring using metric units and interpreting timetables  <b>Problem-solving</b> includes formulating and solving authentic problems using fractions, decimals, percentages and measurements, interpreting secondary data displays and finding the size of unknown angles  <b>Reasoning</b> includes explaining mental strategies for performing calculations, describing results for continuing number sequences, explaining the transformation of one shape into another and explaining why the actual results of chance experiments may differ from expected results.</p> <p><b>NSW Syllabus Mathematics K-10 – Stage 3.2 Outcomes</b></p> <ul style="list-style-type: none"> <li>describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions</li> <li>selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations</li> <li>gives a valid reason for supporting one possible solution over another</li> <li>selects and uses the appropriate unit and device to measure lengths and distances, calculates perimeters, and converts between units of length</li> </ul>

**ASSESSMENT**

**EXIT PASS**

Convert 26.5 cm to mm and metres

Based on your investigation today, what do you think the person was measuring