

LEVEL: Year 6	CONTENT: Number & Algebra	FOCUS: Converting decimals
In the Classroom		
<p>PURPOSE</p>	<ul style="list-style-type: none"> • Identify the qualities and behaviours of a good mathematician • Explain the definition for length and provide examples of when it can be used • Identify the standard unit used to measure length • Explain the relationship between metric units and place value • Estimate the length of different objects • Identify tools used to measure length • Accurately measure the length of an object • Accurately read decimal numbers • Record the length of objects using decimal notation • Explain the relationship between millimetres and centimetres (cm and m; mm and m, etc.), e.g. ten times bigger or ten times smaller • Use multiplication and division to convert between units of length • Investigate the relationship between the length and circumference of cylinders • Apply knowledge of measurements to construct a cylinder 	
<p>INTRODUCTION</p>	<p>Brief introduction to Good Mathematicians – make a list and place on the board, include teamwork, asking questions, sharing ideas, recording ideas, explaining thinking, persistence, checking solutions, working systematically, learning from mistakes and believing in yourself.</p>	
<p>WARM-UP</p>	<p>Show me 100 mm Ask students to (without using any measuring tools) draw a straight line that is 100 mm in length. Talk about how students know their line is accurate. Can they explain their thinking? How can they check their line? What is a definition for length? What do students know about metric units? What is the relationship between metric units and place value? How do students convert between units of length?</p>	
<p>EXPLICIT TEACHING & LEARNING</p>	<p>The Tube Challenge Look at this tube. What is longer, the length or the circumference? Estimate the size of both measurements. Use an appropriate measuring tool to measure and record the length and circumference of the tube. Record the measurements in millimetres and centimetres.</p> <p>Challenge Use paper to construct a cylinder where the circumference and length is equal (or close to equal). Measure each cylinder constructed. Record measurements in millimetres and centimetres</p>	
<p>DISCUSSION/KEY QUESTIONS</p>	<ul style="list-style-type: none"> • What is the metric system? Why is it used? • What are millimetres? • What is the relationship between mm and cm? cm and m; mm and m? • How do we convert between measurements? • What do we mean be 10 times bigger/smaller? • What is length? What is a mathematical definition for length? • How do we measure length? • What do we need to know when using measuring tools? • What is the standard unit for length? • How do we read decimals? • Can we use place value language (or fractional language) to describe decimals? • Can we use a place value chart to help us record numbers and convert between measurements? • Is there another way to find the circumference of a cylinder? • For the height and circumference to be the same what needs to happen? • Can you show a possible solution using algebra? 	
<p>DELIBERATIVE PRACTICE</p>	<p>This task is designed to introduce students to a practical situation that involves multiplying and dividing decimals by powers of 10. We want students to focus to use what they know about the measurement in order to explain how to convert them, rather than simply applying a procedure.</p>	
<p>REFLECTION</p>	<p>Students share solutions and strategies with the class; What did they discover? What worked well? What would they do differently next time? Recap the strategies and behaviours good mathematicians use, ask students to nominate someone they saw being a good mathematician and explain which strategy or behaviour they were demonstrating.</p>	

RESOURCES	Plain A4 paper, tape, scissors, tape measures, 30 cm ruler and one 1 metre ruler								
Curriculum Connections									
CONTENT	<p>VICTORIAN CURRICULUM F-10 (YEAR 6) Fractions & Decimals Multiply and divide decimals by powers of 10(VCMNA216) Elaborations: multiply and divide decimals by multiples of powers of 10 Using units of measurements Connect decimal representations to the metric system(VCMMG222) Elaborations: recognise the equivalence of measurements such as 1.25 metres and 125 centimetres Convert between common metric units of length, mass and capacity (VCMMG223) Elaborations: identify and using the correct operations when converting units including millimetres, centimetres, metres, kilometres, milligrams, grams, kilograms, tonnes, millilitres, litres, kilolitres and megalitres; recognise the significance of the prefixes in units of measurement Solve problems involving the comparison of lengths and areas using appropriate units (VCMMG224) Elaborations: recognise and investigate familiar objects using concrete materials and digital technologies</p>								
WHAT CAME BEFORE	Students will have a basic understanding of decimals and a working definition for length, often “length is how long something is.” It will be important to develop a more formal definition for length – the distance between two points. It is also important to ensure students can use place value language (fractional language) to accurately read and describe decimals, e.g. students read 0.05 as 5 hundredths not point oh 5. Rather than simply applying a procedure to multiply and divide by powers of 10, using measurements gives the skill a real-life context.								
WHAT COMES NEXT	Students will solve problems involving decimal numbers and all four operations. Converting between measurements will continue to be an important skill moving forward. Often problems will use a range of different measurements to ensure students are accurately reading and understanding problems.								
VOCABULARY	Measure, metric, millimetres, centimetres, standard units, metres, convert between, multiplication, division, decimals, fractions, place value, place value chart, whole numbers, height, width, diameter, radius, circumference, perimeter, pi (π)								
MISCONCEPTIONS	Students may be unsure about how to accurately use the measuring tools. When converting measurements, students may describe the “decimal point” as moving. This statement is untrue. The decimal point stays put – the numbers move to show ten times bigger/smaller, etc. Students may also have a misconception regarding the way to correctly read decimals numbers.								
WHAT PROFICIENCIES ARE TO BE UTILISED?	<p>Year 6 (Australian Curriculum) Understanding 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 Fluency 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 Problem-solving includes formulating and solving authentic problems using fractions, decimals, percentages and measurements, interpreting secondary data displays and finding the size of unknown angles Reasoning 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>								
ASSESSMENT	<p>EXIT PASS Ashley, Billie and Charlie made cylinders from paper. Convert the measurements to compare lengths. Explain what you discovered.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Student</th> <th>Length</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>168 mm</td> </tr> <tr> <td>B</td> <td>16.8 cm</td> </tr> <tr> <td>C</td> <td>0.168 m</td> </tr> </tbody> </table>	Student	Length	A	168 mm	B	16.8 cm	C	0.168 m
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