



# CURRICULUM AND ASSESSMENT OUTLINE

## ASSESSMENT ACTIVITY YEAR 6

6

## MATHEMATICS

Area and Perimeter of  
Regular Shapes

### Section 1: Summary

#### Background information

<b>Brief Description of Assessment Activity</b>	Students create a shape comprised of a variety of different smaller shapes and explain how to calculate the area of each shape; therefore, they calculate the area of the complete shape. Students can present this through video or screen recording, oral presentation, or other forms of visual presentation. They must verbalise their reasoning, methods and calculations.			
<b>Context summary</b>	For this unit of work students will have covered the concept of calculating the perimeter of a shape. They will become familiar with the meaning of the area of a shape and the formulas used to calculate this. Students will discuss where and why they will need to calculate the area of a surface in real life, e.g. laying a carpet/tiles etc.			
<b>Purpose</b>	Formative		Summative	
<b>Description of purpose</b>	To assess each student's ability to calculate the area and perimeter of different shapes.			
<b>Audience Suitability</b>	At Year Level	Extension	Students with disability	EAL/D

#### Links to the Australian Curriculum

<b>Content Strand</b>	Number and Algebra		Measurement and Geometry		Probability and Statistics		
<b>Proficiency Strands</b>	Understanding		Fluency		Problem solving		Reasoning
<b>General capabilities</b>	Literacy	Numeracy	ICT capability	Critical and creative thinking	Ethical behaviour	Personal and social capability	Intercultural understanding
<b>Cross-curriculum priorities</b>	Aboriginal and Torres Strait Islander histories and cultures		Asia and Australia's engagement with Asia			Sustainability	



## MATHEMATICS

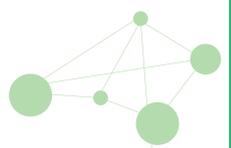
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### Section 2: Links to the Australian Curriculum

Mathematics –Year 6

Content descriptions	Relevant Aspects of the Achievement Standard
<p><b>Measurement and Geometry</b> <b>Using Units of Measurement</b></p> <ul style="list-style-type: none"> <li>Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)</li> </ul> <p><i>Related Content Descriptions</i></p> <p><b>Using Units of Measurements</b></p> <ul style="list-style-type: none"> <li>Convert between common metric units of length, mass and capacity (ACMMG136)</li> </ul> <p><b>Number and Place Value:</b></p> <ul style="list-style-type: none"> <li>Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)</li> </ul>	<p>By the end of Year 6, students recognise the properties of prime, composite, square and triangular numbers. They describe the use of integers in everyday contexts. They solve problems involving all four operations with whole numbers. Students connect fractions, decimals and percentages as different representations of the same number. They solve problems involving the addition and subtraction of related fractions. Students make connections between the powers of 10 and the multiplication and division of decimals. They describe rules used in sequences involving whole numbers, fractions and decimals. Students connect decimal representations to the metric system and choose appropriate units of measurement to perform a calculation. They make connections between capacity and volume. <b>They solve problems involving length and area.</b> They interpret timetables. Students describe combinations of transformations. They solve problems using the properties of angles.</p> <p>Students compare observed and expected frequencies. They interpret and compare a variety of data displays including those displays for two categorical variables. They evaluate secondary data displayed in the media. Students locate fractions and integers on a number line. They calculate a simple fraction of a quantity. They add, subtract and multiply decimals and divide decimals where the result is rational. Students calculate common percentage discounts on sale items. They write correct number sentences using brackets and order of operations. Students locate an ordered pair in any one of the four quadrants on the Cartesian plane. They construct simple prisms and pyramids. Students list and communicate probabilities using simple fractions, decimals and percentages.</p>

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), Australian Curriculum v40 <[www.australiancurriculum.edu.au/Home](http://www.australiancurriculum.edu.au/Home)>





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### Section 3: Student activity

#### Revision of Perimeter

##### Lessons - Perimeter

- teaching of measuring and working out the perimeter of shapes
- watch some fun instructional videos (e.g. BrainPop.com) and discuss the reason why we need to be able to work out the perimeter – real life examples
- hands-on measuring and working out of different perimeters, e.g. Admin building, basketball court, tree trunks (use string and measuring tape), desks etc.
- students measure irregular shapes, not just squares and rectangles
- a common misconception or error students make when having to work out the perimeter of shapes with missing lengths is that they don't fill out the missing lengths of sides first, then add them all up.

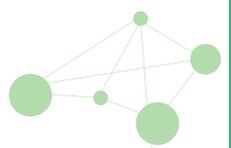
Extension – Have the extension students who already know how to work out the perimeter of regular shapes work on pi. I let them work on “what is pi”, and why the value 3.14 which is calculated by dividing the circumference by the diameter. Perhaps give them some cylinders to measure and do the calculations.

#### Assessment Task – Test on working out the perimeter

##### Lessons and Main Task – Area

- watch some fun instructional videos (BrainPOP, Youtube) on area and a discussion of what it means and why we need to know how to calculate it – real estate, flooring etc.
- introduce units of measurement - cm<sup>2</sup> etc.
- go through formulae used for squares, parallelograms, triangles and circles for the extension students.
- hands-on measuring and working out of different areas, e.g. Admin building, basketball court, tree trunks (use string and measuring tape), desks etc.
- discuss how to work out the area of irregular shapes – pentagon – how many triangles does it hold, how can we work it out knowing that?

Extension – Have the extension students work on the area of a circle using pi. Students measure and calculate the area of the bottom of cylindrical objects in the class or circles of the basketball courts, drains, tree trunks etc.





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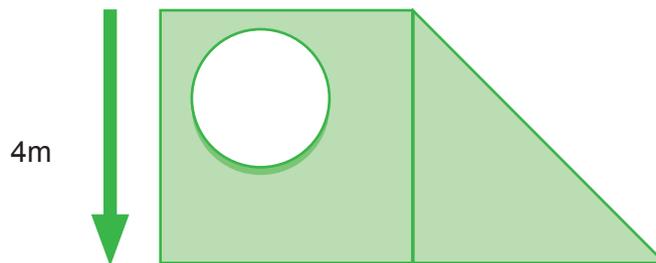
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### Main Assessment Task Area and Perimeter

The students create a shape using the Pages, Word or PowerPoint Application. The shape is to contain many different regular and irregular shapes (see below). The shapes are to be labelled with the length of each of the sides. The students then record information explaining how they work out the area of the different shapes and add them all together. They can record the different areas in a table and add the total at the end. The task is completed to each student's level of ability. The extension students should challenge themselves by including circles and trapezoids. Each student is encouraged to challenge themselves and find out how to work out the areas of more irregular shapes. They can record their presentation by using the QuickTime application – Screen Recording function.

Example of shape to be explained – see example video of screen recording for a more detailed example



Websites:

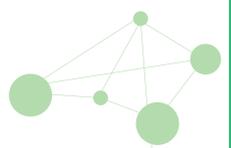
[http://www.spectrumanalytic.com/support/library/ff/area\\_calculations.htm](http://www.spectrumanalytic.com/support/library/ff/area_calculations.htm)

<http://www.primaryresources.co.uk/maths/mathsE4.htm>

<http://math.pppst.com/perimeter.html>

### Student learning associated with this activity

- students learn how to calculate the perimeter of regular and irregular shapes.
- students learn how to calculate the area of regular shapes including squares, triangles, circles, and trapeziums.
- as it is an open ended task, students can develop and apply their problem solving skills.
- students learn to communicate and clearly verbalise their thinking, working out and learning.



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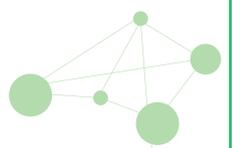
### Other Opportunities

#### Differentiation:

- the task is designed to be used at all levels. The students are encouraged to challenge their thinking and use as many different shapes that they can explain.
- some students may not combine the shapes and calculate the area or perimeter of each separately.
- students may choose to use simpler or more difficult shapes.

#### Other Suggestions:

- students can present their findings/shapes in many different ways. Video recording, screen recording or drawing, photograph, or poster and verbal presentation if technology is not available.





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### Section 5: Reflection

To what extent did the task provide an opportunity for the students to demonstrate their skills and understandings from the curriculum content?	The students were able to work at their own level, while challenging to extend themselves in gaining further understanding. The students who were learning about surface area for the first time were able to demonstrate their understanding using regular shapes, such as squares, rectangles and triangles. The students that understood the concept of surface area were able to research and apply formulas for more difficult shapes, such as trapeziums, circles and hexagons.
What range of achievement was demonstrated by students?	The range of achievement was wide, as some students could really extend themselves with this open task, while allowing the weaker students to demonstrate their understanding of what they have learnt, while also creating a video recording of their work.
Was any additional support required for some students to complete the task?	Some students were unable to complete the task successfully; we had to go back to the start with these students. After the completion of this unit, these students did a similar task focussing on calculating the perimeter.
What misconceptions were revealed from students' responses to the task?	What unit of measurements to use in calculating area and perimeter. Students confusing perimeter with area. Students using the side of the triangle as the height. Converting between the units of measurement. The definition of surface area.
How could this activity be used to inform the planning of future teaching and learning?	It can be used when moving on to setting tasks for Volume and Capacity, as you gain an understanding of students' ability to research, problem solve and apply understandings in different situations. It can inform what revision is needed, in relation to this content.
How could this activity relate to other learning areas?	This could be linked to Technology and Enterprise – design your own playground etc. The Listening and Speaking, viewing and writing strand of English – for example – write a script. I would get the students to do this next time.
Other comments	This task really engaged the students as it was aimed at their current level of understanding, while encouraging them to challenge themselves. Some students thrived and succeeded, while others tried to include too much and struggled. Most were able to demonstrate their understanding of what they had learned over the 4 weeks.