

# SYLLABUS RELATIONSHIPS

## Stage 4 - Measurement

Workbook activities relate to outcomes of the NSW Syllabus as follows:

OUTCOME	Workbook Activities
<b>MS4.1 - Perimeter and area</b>	
<b>Knowledge and skills. Students learn about:</b>	
• estimating lengths and distances using visualisation strategies	1 - 3 3 - 7 9 - 2
• recognising that all measurements are approximate	1 - 5,6,7
• describing the limits of accuracy of measuring instruments ( $\pm 0.5$ unit of measurement)	1 - 8,9
• interpreting the meaning of the prefixes 'milli', 'centi' and 'kilo'	1 - 2
• converting between metric units of length	1 - 2,10
• finding the perimeter of simple composite figures	2 - 1,2,3,4,5 2 - 6,7,8,9
• identifying the hypotenuse as the longest side in any right-angled triangle and also as the side opposite the right angle	5 - 1 11 - 2
• establishing the relationship between the lengths of the sides of a right-angled triangle in practical ways, including the dissection of areas	11 - 1,2
• using Pythagoras' theorem to find the length of sides in right-angled triangles	11 - 3,4,5
• solving problems involving Pythagoras' theorem, giving an exact answer as a surd (eg $\sqrt{5}$ ) and approximating the answer using an approximation of the square root	11 - 5,7
• writing answers to a specified or sensible level of accuracy, using the 'approximately equals' sign	11 - 6,7
• identifying a Pythagorean triad as a set of three numbers such that the sum of the squares of the first two equals the square of the third	11 - 1
• using the converse of Pythagoras' theorem to establish whether a triangle has a right angle	11 - 3
• developing and using formulae for the area of a square and rectangle	4 - 1,5,6,7
• developing (by forming a rectangle) and using the formula for the area of a triangle	5 - 1,2,3,4,5,6,7,8
• finding the areas of simple composite figures that may be dissected into rectangles and triangles	3 - 3,4,6,8 8 - 1,2,3,4,5,6,7,9
• developing the formula by practical means for finding the area of a parallelogram eg by forming a rectangle using cutting and folding techniques	8 - 8,9
• converting between metric units of area $1 \text{ cm}^2 = 100 \text{ mm}^2$ , $1 \text{ m}^2 = 1\,000\,000 \text{ mm}^2$ , $1 \text{ ha} = 10\,000 \text{ m}^2$ , $1 \text{ km}^2 = 1\,000\,000 \text{ m}^2 = 100 \text{ ha}$	3 - 5,8
• demonstrating by practical means that the ratio of the circumference to the diameter of a circle is constant eg by measuring and comparing the diameter and circumference of cylinders	9 - 1,2,3,4,5
• defining the number $\pi$ as the ratio of the circumference to the diameter of any circle	9 - 7
• developing, from the definition of $\pi$ , formulae to calculate the circumference of circles in terms of the radius $r$ or diameter $d$ $C = \pi d$ or $C = 2\pi r$	9 - 7
• developing by dissection and using the formula to calculate the area of circles $A = \pi r^2$	10 - 1,3,4

OUTCOME	Workbook Activities
<b>MS4.1 - Perimeter and area</b> <b>Working Mathematically. Students learn to:</b>	
<ul style="list-style-type: none"> <li>consider the degree of accuracy needed when making measurements in practical situations (<i>Applying Strategies</i>)</li> </ul>	1 - 7,9 9 - 10
<ul style="list-style-type: none"> <li>choose appropriate units of measurement based on the required degree of accuracy (<i>Applying Strategies</i>)</li> </ul>	1 - 7
<ul style="list-style-type: none"> <li>make reasonable estimates for length and area and check by measuring (<i>Applying Strategies</i>)</li> </ul>	1 - 1,3,4 9 - 2,10
<ul style="list-style-type: none"> <li>select and use appropriate devices to measure lengths and distances (<i>Applying Strategies</i>)</li> </ul>	1 - 7,9
<ul style="list-style-type: none"> <li>discuss why measurements are never exact (<i>Communicating, Reasoning</i>)</li> </ul>	1 - 5,6
<ul style="list-style-type: none"> <li>describe the relationship between the sides of a right-angled triangle (<i>Communicating</i>)</li> </ul>	11 - 1,3
<ul style="list-style-type: none"> <li>use Pythagoras' theorem to solve practical problems involving right-angled triangles (<i>Applying Strategies</i>)</li> </ul>	11 - 6,7,8
<ul style="list-style-type: none"> <li>apply Pythagoras' theorem to solve problems involving perimeter and area (<i>Applying Strategies</i>)</li> </ul>	11 - 3,9
<ul style="list-style-type: none"> <li>identify the perpendicular height of triangles and parallelograms in different orientations (<i>Communicating</i>)</li> </ul>	5 - 2,3,4,8 8 - 8,9,10
<ul style="list-style-type: none"> <li>find the dimensions of a square given its perimeter, and of a rectangle given its perimeter and one side length (<i>Applying Strategies</i>)</li> </ul>	4 - 5,6,9
<ul style="list-style-type: none"> <li>solve problems relating to perimeter, area and circumference (<i>Applying Strategies</i>)</li> </ul>	2 - 2,6,9 3 - 1,2,8 4 - 1,3,5,7,8 5 - 6,7,8 8 - 1,2,3,4,5,6 9 - 2,3,4,5,6,7,8,9 10 - 5,6
<ul style="list-style-type: none"> <li>compare rectangles with the same area and ask questions related to their perimeter such as whether they have the same perimeter (<i>Questioning, Applying Strategies, Reasoning</i>)</li> </ul>	4 - 2,3
<ul style="list-style-type: none"> <li>compare various shapes with the same perimeter and ask questions related to their area such as whether they have the same area (<i>Questioning</i>)</li> </ul>	4 - 2,9 8 - 10
<ul style="list-style-type: none"> <li>explain the relationship that multiplying, dividing, squaring and factoring have with the areas of squares and rectangles with integer side lengths (<i>Reflecting</i>)</li> </ul>	4 - 1,3,5,6,10
<ul style="list-style-type: none"> <li>use mental strategies to estimate the circumference of circles, using an approximate value of <math>\pi</math> eg 3 (<i>Applying Strategies</i>)</li> </ul>	9 - 10
<ul style="list-style-type: none"> <li>find the area and perimeter of quadrants and semi-circles (<i>Applying Strategies</i>)</li> </ul>	10 - 2
<ul style="list-style-type: none"> <li>find radii of circles given their circumference or area (<i>Applying Strategies</i>)</li> </ul>	9 - 9 10 - 5
<ul style="list-style-type: none"> <li>solve problems involving <math>\pi</math>, giving an exact answer in terms of <math>\pi</math> and an approximate answer using <math>\frac{22}{7}</math>, 3.14 or a calculator's approximation for <math>\pi</math> (<i>Applying Strategies</i>)</li> </ul>	9 - 8,9 10 - 5,6
<ul style="list-style-type: none"> <li>compare the perimeter of a regular hexagon inscribed in a circle with the circle's circumference to demonstrate that <math>\pi &gt; 3</math> (<i>Reasoning</i>)</li> </ul>	9 - 6

OUTCOME	Workbook Activities
<b>MS4.2 - Volume and capacity</b>	
<b>Knowledge and skills. Students learn about:</b>	
• identifying the surface area and edge lengths of rectangular and triangular prisms	14 - 2,3,4
• finding the surface area of rectangular and triangular prisms by practical means eg from a net	14 - 3,4
• calculating the surface area of rectangular and triangular prisms	14 - 2,4
• converting between units of volume 1 cm <sup>3</sup> = 1000 mm <sup>3</sup> , 1L = 1000 mL = 1000 cm <sup>3</sup> , 1 m <sup>3</sup> = 1000 L = 1 kL	12 - 9 13 - 1,4,5,8
• using the kilolitre as a unit in measuring large volumes	13 - 4
• constructing and drawing various prisms from a given cross-sectional diagram	12 - 3,4
• identifying and drawing the cross-section of a prism	12 - 1,2,5
• developing the formula for volume of prisms by considering the number and volume of layers of identical shape  <i>Volume = base area × height</i>	12 - 6,12
• calculating the volume of a prism given its perpendicular height and the area of its cross-section	12 - 6,7
• calculating the volume of prisms with cross-sections that are rectangular and triangular	12 - 6,7
• calculating the volume of prisms with cross-sections that are simple composite figures that may be dissected into rectangles and triangles	12 - 7
• developing and using the formula to find the volume of cylinders ( <i>r</i> is the length of the radius of the base and <i>h</i> is the perpendicular height) $V = \pi r^2 h$	12 - 8,10,13
<b>MS4.2 - Volume and capacity</b>	
<b>Working Mathematically. Students learn to:</b>	
• solve problems involving surface area of rectangular and triangular prisms ( <i>Applying Strategies</i> )	14 - 5,6,7,8
• solve problems involving volume and capacity of right prisms and cylinders ( <i>Applying Strategies</i> )	12 - 9,10,11,13 13 - 4,6,7,9
• recognise, giving examples, that prisms with the same volume may have different surface areas, and prisms with the same surface area may have different volumes ( <i>Reasoning, Applying Strategies</i> )	14 - 5,6,7

OUTCOME	Workbook Activities
<b>MS4.3 - Time</b> <b>Knowledge and skills. Students learn about:</b>	
<ul style="list-style-type: none"> <li>adding and subtracting time mentally using bridging strategies eg from 2:45 to 3:00 is 15 minutes and from 3:00 to 5:00 is 2 hours, so the time from 2:45 until 5:00 is 15 minutes + 2 hours = 2 hours 15 minutes</li> </ul>	6 – 8,9
<ul style="list-style-type: none"> <li>adding and subtracting time with a calculator using the 'degrees, minutes, seconds' button</li> </ul>	6 - 7
<ul style="list-style-type: none"> <li>rounding calculator answers to the nearest minute or hour</li> </ul>	6 - 7
<ul style="list-style-type: none"> <li>interpreting calculator displays for time calculations eg 2.25 on a calculator display for time means <math>2\frac{1}{4}</math> hours</li> </ul>	6 - 7
<ul style="list-style-type: none"> <li>comparing times and calculating time differences between major cities of the world eg 'Given that London is 10 hours behind Sydney, what time is it in London when it is 6:00 pm in Sydney?'</li> </ul>	7 - 2,4,5,6,7
<ul style="list-style-type: none"> <li>interpreting and using tables relating to time eg tide charts, sunrise/sunset tables, bus, train and airline timetables, standard time zones</li> </ul>	6 – 8,9 7 - 6,7
<b>MS4.3 - Time</b> <b>Working Mathematically. Students learn to:</b>	
<ul style="list-style-type: none"> <li>plan the most efficient journey to a given destination involving a number of connections and modes of transport (<i>Applying Strategies</i>)</li> </ul>	6 - 9
<ul style="list-style-type: none"> <li>ask questions about international time relating to everyday life eg whether a particular soccer game can be watched live on television during normal waking hours (<i>Questioning</i>)</li> </ul>	7 - 5,7
<ul style="list-style-type: none"> <li>solve problems involving calculations with mixed time units eg 'How old is a person today if he/she was born on 30/6/1989?' (<i>Applying Strategies</i>)</li> </ul>	6 - 7,8,9 7 - 1,4,7