SYLLABUS RELATIONSHIPS

Activities that teach Measurement

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

OUTCOME	Workbook Activities
MS4.1 - Perimeter and area **Knowledge and skills. Students learn about:**	
• 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 cm^2 = 100 mm^2 , 1 m^2 = 1 000 000 mm^2 , 1 ha = 10 000 m^2, 1 km^2 = 1 000 000 m^2 = 100 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 π as the ratio of the circumference to the diameter of any circle	9 - 7
• developing, from the definition of π, 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
MS4.1 - Perimeter and area **Working Mathematically. Students learn to:**	
• consider the degree of accuracy needed when making measurements in practical situations *(Applying Strategies)*	1 - 7,9 9 - 10
• choose appropriate units of measurement based on the required degree of accuracy *(Applying Strategies)*	1 - 7
• make reasonable estimates for length and area and check by measuring *(Applying Strategies)*	1 - 1,3,4 9 - 2,10
• select and use appropriate devices to measure lengths and distances *(Applying Strategies)*	1 - 7,9
• discuss why measurements are never exact *(Communicating, Reasoning)*	1 - 5,6
• describe the relationship between the sides of a right-angled triangle *(Communicating*)	11 - 1,3
• use Pythagoras' theorem to solve practical problems involving right-angled triangles *(Applying Strategies)*	11 - 6,7,8
• apply Pythagoras' theorem to solve problems involving perimeter and area *(Applying Strategies)*	11 - 3,9
• identify the perpendicular height of triangles and parallelograms in different orientations *(Communicating)*	5 - 2,3,4,8 8 - 8,9,10
• find the dimensions of a square given its perimeter, and of a rectangle given its perimeter and one side length *(Applying Strategies)*	4 - 5,6,9
• solve problems relating to perimeter, area and circumference *(Applying Strategies)*	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
• compare rectangles with the same area and ask questions related to their perimeter such as whether they have the same perimeter *(Questioning, Applying Strategies, Reasoning)*	4 - 2,3
• compare various shapes with the same perimeter and ask questions related to their area such as whether they have the same area *(Questioning)*	4 - 2,9 8 - 10
• explain the relationship that multiplying, dividing, squaring and factoring have with the areas of squares and rectangles with integer side lengths *(Reflecting)*	4 - 1,3,5,6,10
• use mental strategies to estimate the circumference of circles, using an approximate value of π eg 3 *(Applying Strategies)*	9 - 10
• find the area and perimeter of quadrants and semi-circles *(Applying Strategies)*	10 - 2
• find radii of circles given their circumference or area *(Applying Strategies)*	9 - 9 10 - 5
• solve problems involving π , giving an exact answer in terms of π and an approximate answer using $\frac{22}{7}$, 3.14 or a calculator's approximation for π *(Applying Strategies)*	9 - 8,9 10 - 5,6
• compare the perimeter of a regular hexagon inscribed in a circle with the circle's circumference to demonstrate that $\pi > 3$ *(Reasoning)*	9 - 6

OUTCOME	Workbook Activities
MS4.2 - Volume and capacity **Knowledge and skills. Students learn about:**	
• 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^3 = 1000 mm^3, 1L = 1000 mL = 1000 cm^3, 1 m^3 = 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 $Volume = base\ area \times height$	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 (*r* is the length of the radius of the base and *h* is the perpendicular height) $V = \pi r^2 h$	12 - 8,10,13
MS4.2 - Volume and capacity **Working Mathematically. Students learn to**:	
• solve problems involving surface area of rectangular and triangular prisms *(Applying Strategies)*	14 - 5,6,7,8
• solve problems involving volume and capacity of right prisms and cylinders *(Applying Strategies)*	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 *(Reasoning, Applying Strategies)*	14 - 5,6,7

OUTCOME	Workbook Activities
MS4.3 - Time **Knowledge and skills. Students learn about:**	
• 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	6 – 8,9
• adding and subtracting time with a calculator using the 'degrees, minutes, seconds' button	6 - 7
• rounding calculator answers to the nearest minute or hour	6 - 7
• interpreting calculator displays for time calculations eg 2.25 on a calculator display for time means $2\frac{1}{4}$ hours	6 - 7
• 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?'	7 - 2,4,5,6,7
• interpreting and using tables relating to time eg tide charts, sunrise/sunset tables, bus, train and airline timetables, standard time zones	6 – 8,9 7 - 6,7
MS4.3 - Time **Working Mathematically. Students learn to:**	
• plan the most efficient journey to a given destination involving a number of connections and modes of transport *(Applying Strategies)*	6 - 9
• 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 *(Questioning)*	7 - 5,7
• solve problems involving calculations with mixed time units eg 'How old is a person today if he/she was born on 30/6/1989?' *(Applying Strategies)*	6 - 7,8,9 7 - 1,4,7