

# SYLLABUS RELATIONSHIPS

## Activities that teach Number

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

OUTCOME	Workbook Activities
<b>NS4.1 - Operations with Whole Numbers</b>	
<b>Knowledge and skills. Students learn about:</b>	
<ul style="list-style-type: none"> <li>expressing a number as a product of its prime factors</li> </ul>	5 - 1,2,3,4,8,9
<ul style="list-style-type: none"> <li>using index notation to express powers of numbers (positive indices only) eg <math>8 = 2^3</math></li> </ul>	4 - 1,2,3,4,5 5 - 8,9
<ul style="list-style-type: none"> <li>using the notation for square root (<math>\sqrt{\quad}</math>) and cube root (<math>\sqrt[3]{\quad}</math>)</li> </ul>	4 - 6,7,8
<ul style="list-style-type: none"> <li>recognising the link between squares and square roots and cubes and cube roots eg <math>2^3 = 8</math> and <math>\sqrt[3]{8} = 2</math></li> </ul>	4 - 1,2
<ul style="list-style-type: none"> <li>exploring through numerical examples that:                             <ul style="list-style-type: none"> <li><math>(ab)^2 = a^2b^2</math>, eg <math>(2 \times 3)^2 = 2^2 \times 3^2</math></li> <li><math>\sqrt{ab} = \sqrt{a} \times \sqrt{b}</math>, eg <math>\sqrt{9 \times 4} = \sqrt{9} \times \sqrt{4}</math></li> </ul> </li> </ul>	4 - 6,7,8,9
<ul style="list-style-type: none"> <li>finding square roots and cube roots of numbers expressed as a product of their prime factors</li> </ul>	5 - 9
<ul style="list-style-type: none"> <li>finding square roots and cube roots of numbers using a calculator, after first estimating</li> </ul>	4 - 6,8 8 - 9
<ul style="list-style-type: none"> <li>identifying special groups of numbers including figurate numbers, palindromic numbers, Fibonacci numbers, numbers in Pascal's triangle</li> </ul>	13 - 1,2,3,4,5,6 14 - 1,2,3,4,5,6,7,8
<ul style="list-style-type: none"> <li>comparing the Hindu-Arabic number system with number systems from different societies past and present</li> </ul>	1 - 1,2,3,4
<ul style="list-style-type: none"> <li>determining and applying tests of divisibility</li> </ul>	5 - 5,6,7
<ul style="list-style-type: none"> <li>using an appropriate non-calculator method to divide two-and three-digit numbers by a two-digit number</li> </ul>	1 - 8
<ul style="list-style-type: none"> <li>applying a range of mental strategies to aid computation, for example                             <ul style="list-style-type: none"> <li>a practical understanding of associativity and commutativity eg <math>2 \times 7 \times 5 = 7 \times (2 \times 5) = 70</math></li> <li>to multiply a number by 12, first multiply by 6 and then double the result</li> <li>to multiply a number by 13, first multiply the number by ten and then add 3 times the number</li> <li>to divide by 20, first halve the number and then divide by 10</li> <li>a practical understanding of the distributive law eg to multiply any number by 9 first multiply by 10 and then subtract the number</li> </ul> </li> </ul>	1 - 7 7 - 1,2,3,4,5,6,7,8,9
<b>NS4.1 - Operations with Whole Numbers</b>	
<b>Working Mathematically. Students learn to:</b>	
<ul style="list-style-type: none"> <li>question whether it is more appropriate to use mental strategies or a calculator to find the square root of a given number (<i>Questioning</i>)</li> </ul>	4 - 6,9 5 - 9
<ul style="list-style-type: none"> <li>discuss the strengths and weaknesses of different number systems (<i>Communicating, Reasoning</i>)</li> </ul>	1 - 1,2,3,4
<ul style="list-style-type: none"> <li>describe and recognise the advantages of the Hindu-Arabic number system (<i>Communicating, Reasoning</i>)</li> </ul>	1 - 1,2,3,4
<ul style="list-style-type: none"> <li>apply tests of divisibility mentally as an aid to calculation (<i>Applying Strategies</i>)</li> </ul>	5 - 7
<ul style="list-style-type: none"> <li>verify the various tests of divisibility (<i>Reasoning</i>)</li> </ul>	5 - 5

OUTCOME	Workbook Activities
<b>NS4.2 - Integers</b> <b>Knowledge and skills. Students learn about:</b>	
• recognising the direction and magnitude of an integer	3 - 1,2,3
• placing directed numbers on a number line	3 - 1 6 - 7
• ordering directed numbers	3 - 1
• interpreting different meanings (direction or operation) for the + and – signs depending on the context	3 - 1,2,3,4,5
• adding and subtracting directed numbers	3 - 2,3,4,5,6,8
• multiplying and dividing directed numbers	3 - 7,8
• using grouping symbols as an operator	4 - 7,8
• applying order of operations to simplify expressions	4 - 7,8
• keying integers into a calculator using the +/- key	3 - 6
• using a calculator to perform operations with integers	3 - 6 4 - 8
<b>NS4.2 - Integers</b> <b>Working Mathematically. Students learn to:</b>	
• interpret the use of directed numbers in a real world context eg rise and fall of temperature ( <i>Communicating</i> )	3 - 1,2,6
• construct a directed number sentence to represent a real situation ( <i>Communicating</i> )	3 - 8
• apply directed numbers to calculations involving money and temperature ( <i>Applying Strategies, Reflecting</i> )	3 - 1,8
• use number lines in applications such as time lines and thermometer scales ( <i>Applying Strategies, Reflecting</i> )	3 - 1
• verify, using a calculator or other means, directed number operations eg subtracting a negative number is the same as adding a positive number ( <i>Reasoning</i> )	3 - 4,5,6
• question whether it is more appropriate to use mental strategies or a calculator when performing operations with integers ( <i>Questioning</i> )	7 - 9

<b>OUTCOME</b>	<b>Workbook Activities</b>
<b><u>NS4.3 - Fractions, Decimals and Percentages</u></b> <b>Knowledge and skills. Students learn about:</b>	
• finding highest common factors and lowest common multiples	5 - 3,4
• finding equivalent fractions	6 - 1,5,8 8 - 2
• reducing a fraction to its lowest equivalent form	6 - 8
• adding and subtracting fractions using written methods	8 - 2,3
• expressing improper fractions as mixed numerals and vice versa	6 - 7 8 - 8
• adding mixed numerals	8 - 4
• subtracting a fraction from a whole number eg $3 - \frac{2}{3} = 2 + 1 - \frac{2}{3} = 2\frac{1}{3}$	8 - 4
• multiplying and dividing fractions and mixed numerals	8 - 5,6,7,8
• adding, subtracting, multiplying and dividing decimals (for multiplication and division, limit operators to two-digits)	2 - 9,10,11
• determining the effect of multiplying or dividing by a number less than one	7 - 1 8 - 5,6,7
• rounding decimals to a given number of places	2 - 5,6
• using the notation for recurring (repeating) decimals	2 - 8
• converting fractions to decimals (terminating and recurring) and percentages	2 - 8 6 - 4 9 - 4,7
• converting terminating decimals to fractions and percentages	2 - 7 9 - 2,3,4
• converting percentages to fractions and decimals	9 - 9,10,12
• calculating fractions, decimals and percentages of quantities	6 - 1,2,3,4 8 - 1,2,5,6,7,10 9 - 1,2,3,4
• increasing and decreasing a quantity by a given percentage	9 - 6,7,8,9,10, 11,12
• interpreting and calculating percentages greater than 100% eg an increase from 6 to 18 is an increase of 200%; 150% of \$2 is \$3	9 - 7,8,11,12
• expressing profit and/or loss as a percentage of cost price or selling price	9 - 7,11,
• ordering fractions, decimals and percentages	2 - 3 6 - 9 9 - 3
• expressing one quantity as a fraction or a percentage of another eg 15 minutes is $\frac{1}{4}$ or 25% of an hour	8 - 1 9 - 3
• using ratio to compare quantities of the same type	11 - 2,3,6,8,9,10
• writing ratios in various forms eg $\frac{4}{6}$ , 4:6, 4 to 6	11 - 1,5
• simplifying ratios eg $4:6 = 2:3$ , $\frac{1}{2}:2 = 1:4$ , $0.3:1 = 3:10$	11 - 3
• applying the unitary method to ratio problems	11 - 4
• dividing a quantity in a given ratio	11 - 8,9
• interpreting and calculating ratios that involve more than two numbers	11 - 7,8
• calculating speed given distance and time	10 - 2,4,6,8,9
• calculating rates from given information eg 150 kilometres travelled in 2 hours	10 - 1,2,3,4,5,6,7, 8,9

OUTCOME	Workbook Activities
<b>NS4.3 - Fractions, Decimals and Percentages</b> <b>Working Mathematically. Students learn to:</b>	
<ul style="list-style-type: none"> <li>explain multiplication of a fraction by a fraction using a diagram to illustrate the process (Reasoning, Communicating)</li> </ul>	8 - 5
<ul style="list-style-type: none"> <li>explain why division by a fraction is equivalent to multiplication by its reciprocal (Reasoning, Communicating)</li> </ul>	8 - 6,7
<ul style="list-style-type: none"> <li>choose the appropriate equivalent form for mental computation eg 10% of \$40 is <math>\frac{1}{10}</math> of \$40</li> </ul>	7 - 9
<ul style="list-style-type: none"> <li>recognise and explain incorrect operations with fractions eg explain why <math>\frac{2}{3} + \frac{1}{4} \neq \frac{3}{7}</math> (Applying Strategies, Reasoning, Communicating)</li> </ul>	6 - 8
<ul style="list-style-type: none"> <li>question the reasonableness of statements in the media that quote fractions, decimals or percentages eg 'the number of children in the average family is 2.3' (Questioning)</li> </ul>	9 - 5
<ul style="list-style-type: none"> <li>interpret a calculator display in formulating a solution to a problem, by appropriately rounding a decimal (Communicating, Applying Strategies)</li> </ul>	2 - 6 14 - 4
<ul style="list-style-type: none"> <li>recognise equivalences when calculating eg multiplication by 1.05 will increase a number/quantity by 5%, multiplication by 0.87 will decrease a number/quantity by 13% (Applying Strategies)</li> </ul>	9 - 9,10,12
<ul style="list-style-type: none"> <li>solve a variety of real-life problems involving fractions, decimals and percentages (Applying Strategies)</li> </ul>	8 -10 9 -13
<ul style="list-style-type: none"> <li>use a number of strategies to solve unfamiliar problems, including: <ul style="list-style-type: none"> <li>- using a table</li> <li>- looking for patterns</li> <li>- simplifying the problem</li> <li>- drawing a diagram</li> <li>- working backwards</li> <li>- guess and refine</li> </ul> (Applying Strategies, Communicating) </li> </ul>	4 - 6 13 - 1,2,3,4,5,6,7 14 - 5  Read: Methods of Problem Solving
<ul style="list-style-type: none"> <li>interpret media and sport reports involving percentages (Communicating)</li> </ul>	9 - 5
<ul style="list-style-type: none"> <li>evaluate best buys and special offers eg discounts (Applying Strategies)</li> </ul>	9 - 10
<ul style="list-style-type: none"> <li>interpret descriptions of products that involve fractions, decimals, percentages or ratios eg on labels of packages (Communicating)</li> </ul>	9 - 2,11,12 10 - 1,6 11 - 2,3,8,9,10
<ul style="list-style-type: none"> <li>solve a variety of real-life problems involving ratios eg scales on maps, mixes for fuels or concrete, gear ratios (Applying Strategies)</li> </ul>	11 - 2,3,4,5,6,7,8,9,10 12 - 5
<ul style="list-style-type: none"> <li>solve a variety of real-life problems involving rates eg batting and bowling strike rates, telephone rates, speed, fuel consumption (Applying Strategies)</li> </ul>	10 - 1,2,3,4,5,6,7,8,9

OUTCOME	Workbook Activities
<b>NS4.4 - Probability</b> <b>Knowledge and skills. Students learn about:</b>	
• listing all possible outcomes of a simple event	12 - 1,2,4
• using the term 'sample space' to denote all possible outcomes eg for tossing a fair die, the sample space is 1, 2, 3, 4, 5, 6	12 - 1
• assigning probabilities to simple events by reasoning about equally likely outcomes eg the probability of a 5 resulting from the throw of a fair die is $\frac{1}{6}$	12 - 3
• expressing the probability of a particular outcome as a fraction between 0 and 1	12 - 4
• assigning a probability of zero to events that are impossible and a probability of one to events that are certain	12 - 4
• recognising that the sum of the probabilities of all possible outcomes of a simple event is 1	12 - 6
• identifying the complement of an event eg 'The complement of drawing a red card from a deck of cards is drawing a black card.'	12 - 6
• finding the probability of a complementary event	12 - 6
<b>NS4.4 - Probability</b> <b>Working Mathematically. Students learn to:</b>	
• solve simple probability problems arising in games ( <i>Applying Strategies</i> )	12 - 7,8
• use language associated with chance events appropriately ( <i>Communicating</i> )	12 - 1,3
• evaluate media statements involving probability ( <i>Applying Strategies, Communicating</i> )	12 - 9
• interpret and use probabilities expressed as percentages or decimals ( <i>Applying Strategies, Communicating</i> )	12 - 4,10
• explain the meaning of a probability of 0, $\frac{1}{2}$ and 1 in a given situation ( <i>Communicating, Reasoning</i> )	12 - 3,4