

SYLLABUS RELATIONSHIPS

Stage 4 - Number

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

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

OUTCOME	Workbook Activities
<u>NS4.2 - Integers</u> Knowledge and skills. Students learn about:	
• 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
<u>NS4.2 - Integers</u> Working Mathematically. Students learn to:	
• 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

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

OUTCOME	Workbook Activities
NS4.4 - Probability Knowledge and skills. Students learn about:	
• 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
NS4.4 - Probability Working Mathematically. Students learn to:	
• 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