

## 2005 MATHEMATICS CALENDAR

### Term 1

31/1	<i>PAT, other</i>	M T W T F
7/2	<b>Number Order of Operation</b>	M T W T F
14/2	<b>Number Integers, Decimals &amp; Powers</b>	M T W T F
21/2		M T W T F
28/2	<i>Progress Test</i>	M T W T F
7/3		M T W T F
14/3	<b>Number Fractions and Percentages</b>	M T W T F
21/3		M T W T F
28/3		M T W T F
4/4		M T W T F
11/4	<b>Number Revision and Test</b>	M T W T

### Term 2

2/5	<b>Measurement Distance, Time and Space</b>	M T W T F
9/5		M T W T F
16/5	<b>Geometry Angles</b>	M T W T F
23/5	<b>Geometry Shapes and Transformations</b>	M T W T F
30/5	<i>Progress Test</i>	M T W T F
6/6		M T W T F
13/6	<b>Geometry Constructions and 3-Dimensions</b>	M T W T F
20/6		M T W T F
27/6		M T W T F
4/7	<b>Geometry Revision and Test</b>	M T W T F

## YEAR 9 MATHEMATICS

### Term 3

25/7	<b>Algebra Algebraic Patterns</b>	M T W T F
1/8		M T W T F
8/8	<b>Algebra Expand and Factor</b>	M T W T F
15/8		M T W T F
22/8	<i>Progress Test</i>	M T W T F
29/8	<b>Algebra Linear Equations</b>	M T W T F
5/9		M T W T F
12/9	<b>Algebra Linear Graphs</b>	M T W T F
19/9		M T W T F
26/9	<b>Algebra Revision and Test</b>	M T W T F

### Term 4

10/10	<b>Probability</b>	M T W T F
17/10		M T W T F
24/10	Revision	M T W T F
31/10	NCEA Style Test Probability	M T W T F
7/11	NCEA Style Test Geometry	M T W T F
14/11	NCEA Style Test Algebra	M T W T F
21/11	<b>Geometry Pythagoras and Trigonometry</b>	M T W T F
28/11		M T W T F
5/12		M T W T F

<b>Year 9</b>	<b>Minz Level: 4 and 5</b>	<b>Order of Operation</b>		<b>Time: 1 Week</b>	
Achievement Objectives: n4(11) bedmas		Essential Skills:    esN2 estimation	Text references: <b>ALPHA</b> Ch 6 p 81 - 85 Brackets and Order of Operations		
		Mathematical Processes: dlr 2    interpret in context cm 1    explain mathematical ideas			Other resources:
<b>Checklist:</b> Review order in arithmetic (minus and divide are not commutative, order of operations (BEDMAS), use of brackets / calculator memory)		<b>"Achievement"</b> Find the values of :Calculate answers to number problems using correct order of operations			
		<b>"Merit"</b>			
		<b>"Excellence"</b> Set out work logically when solving a number problem Solve a simple word problem involving more than two steps			
<b>Equipment needed:</b> Calculators, spreadsheets (calculation formulae, and rounding and sorting functions)		<b>Other Comments:</b>			



<b>Year 9</b>	<b>Minzc Level: 4 and 5</b>	<b>Fractions and Percentages</b>		<b>Time: 3 Weeks</b>
<p>Achievement Objectives:  n4(3) equivalent fractions  n4(4), (5) convert to / from decimal/ %  n4(6) give quantity as frac / % of whole  n4(9) find frac / % of quantity  n5(5) solve practical % probs  n5(7) find quantity as% of quantity</p>		<p>Essential Skills:  esSE 4 adapt to new technologies  esN1 accurate calculation</p>	<p>Text references:  <b>ALPHA</b>  Ch 1 p1 - 20 Spreadsheets  Ch 7 p86 - 111 Fractions  Ch 8 p112 - 123 Percentages</p>	<p>Other resources:</p>
<p><u>Checklist:</u>  Definitions (percentage, numerator, denominator, equivalent fraction, improper fraction, mixed number)  Conversion between decimals and percentages, percentages and fractions, decimals and fractions (including use of <math>a^b/c</math> calculator button)  Conversion between improper fractions and mixed numbers  (including <math>a^b/c</math> and <math>d/c</math>)  Calculating fractions of quantities  Calculating percentages of quantities  (including use of calculator % button)  Calculating quantities as percentages of other quantities  Using spreadsheets to perform calculations</p>		<p>Mathematical Processes: 5 6 1 1  dlr 3 generalise mathematical ideas  cm 3 record information</p>	<p>“Achievement”  Find equivalent fractions  Convert between fractions, decimals and percentages  Find a fraction of a quantity</p>	<p>“Merit”  Express one quantity as a percentage of another  Find a percentage of a quantity</p> <p>“Excellence”  Set out work logically when solving a number problem  Solve a simple word problem involving more than 2 steps  Round numbers sensibly</p>
<p>Equipment needed:  Calculators, spreadsheets (calculation formulae, filling, rounding and sorting functions)</p>			<p>Other Comments:</p>	

Year 9	Minzc Level: 4 and 5	Distance, Time and Space	Time: 2 Weeks
<p>Achievement Objectives:</p> <p>m4(1) carry out tasks involving reading scales to the nearest gradation;</p> <p>m4(3) read &amp; construct a variety of scales, timetables, &amp; charts;</p> <p>m4(5) perform calculations with time, including 24-hour clock times.</p>		<p>Essential Skills:</p> <p>esN4 recognise, understand, &amp; respond to info presented in ... tables...</p>	<p>Text references:</p> <p><i>ALPHA</i></p> <p>Ch 9 p124 – 151 Everyday measurements</p> <p>Ch 10 p165 – 172 More everyday measurement</p>
<p><u>Checklist:</u></p> <p>Convert 24h time to am / pm time</p> <p>Convert units for time, mass, capacity, temperature (including °F to / from °C )</p> <p>Read timetables and time zones</p> <p>Time activities, weigh items, read capacities, measure temperature</p> <p>Perform calculations with times (incl. ° ' " button) , speeds, masses, temperatures, capacities (incl. before &amp; after item added, item capacity)</p>		<p>Mathematical Processes: 5</p> <p>Use equipment appropriately when exploring mathematical ideas.</p>	<p>Other resources:</p> <p>“Achievement” Use equipment to make measurements</p> <p>Use measurements in calculations &amp; conversions to solve simple problems</p> <p>Measurements of mass, capacity, time</p> <p>Conversion of units of mass, capacity</p> <p>Use of simple tables</p> <p>Conversion between 12 hour and 24 hour clock</p> <p>“Merit” Solve measurement problems involving mass, capacity, time and applications with time tables &amp; international time zones</p> <p>“Excellence” Plan, carry out and evaluate a measuring task and Solve more complex measurement problems</p> <p>Word problems</p> <p>Evaluation could involve description &amp; critiquing of the process used.</p>
<p>Equipment needed:</p> <p>Stopwatches, calculators, kitchen / bathroom scales, thermometers, hot and cold items, "masses" to weigh, "vessels" to fill</p>		<p>Other Comments:</p>	

Year 9	Minzc Level: 4 and 5	Angles	Time: 1 Week
Achievement Objectives: g5(1), (2) parallel lines / polygons		Essential Skills: esSE 6 self appraisal esPH 4 sporting activity skill	Text references: <b>ALPHA</b> Ch 14 p 206 – 228 Angles Ch 18 p 261 – 276 Parallel Lines (including Bearings)
<b>Checklist:</b> <i>Use a compass appropriately to navigate a course on a grid using bearings</i> Practical and theoretical compass work Grid references Drawing and measuring bearings – written and practical <i>Calculate sizes of angles in objects by using angle properties of parallel lines and the angle properties of polygons (reasons to be given).</i>  Angle rules (point, line, vertically opposite, alternate, co-interior, corresponding [FUZX])  Polygons rules (tri sum, tri ext, quad sum, general int sum, ext sum) Use Sketchpad, drawing instruments and paper folding to construct, label, measure and investigate lines, (including parallel lines with transversals), angles, and polygons (including ext angles)		Mathematical Processes: ps 5 appropriate use of equipment cm 2 devise / follow instructions	
Equipment needed: Compasses, protractors, rulers, Sketchpad		Other Comments: Bearings to be partially self-assessed group work at Mavora (compass activity) in week 3.	

Year 9	Minzc Level: 4 and 5	<b>Shapes and Transformations</b>		<b>Time: 3 Weeks</b>
<p>Achievement Objectives:</p> <p>g4(7) describe reflection or rotational symmetry of a figure or object;</p> <p>g5(10) apply the symmetry and angle properties of polygons</p> <p>g5(10) use and interpret vectors which describe translations;</p> <p>g5 (11) identify and use invariant properties under transformations.</p>		<p>Essential Skills: esPR2 exercise imagination, initiative and flexibility;</p>	<p>Text references:</p> <p><i>ALPHA</i></p> <p>Ch 15 p229 – 241 Reflection</p> <p>Ch 16 p242 – 249 Rotation</p> <p>Ch 17 p250 – 260 Translation</p> <p>Ch 19 p277 – 295 Symmetry</p>	
<p><u>Checklist:</u></p> <p>Use drawing instruments and sketchpad to reflect, rotate, enlarge and translate objects</p> <p>Identify invariant properties</p> <p>Describe symmetry - rotational and reflection, orders</p> <p>Use drawing instruments and sketchpad to create tessellations and symmetrical patterns using reflection, rotation, translation</p>		<p>Mathematical Processes: 13</p> <p>Report the results of mathematical explorations concisely and coherently.</p>	<p>Other resources:</p>	
		<p>“Achievement” Perform simple isometric transformations</p> <p>Reflecting objects in horizontal and vertical lines.</p> <p>Identifying the axes of symmetry of a shape.</p> <p>Rotating objects by half or quarter turn.</p> <p>Identifying the order of rotational symmetry of a shape</p> <p>Translating objects given instructions.</p> <p>Drawing tessellations.</p>		
		<p>“Merit” Perform and describe isometric transformations.</p> <p>Reflecting objects in any mirror line, including 2-way reflections.</p> <p>Finding the centre of rotation when angle of rotation is 90° or 180°.</p> <p>Describing reflection, rotation and translation.</p> <p>Identifying invariant properties from a list.</p>		
		<p>“Excellence” Demonstrate an understanding of drawing techniques associated with geometry</p> <p>Identifying the invariant properties of the isometrics .</p> <p>Explaining why a shape tessellates.</p>		
<p>Other Comments:</p> <p>Self-evaluation describing use of sketchpad in patterns / tessellations. Oral or written.</p>		<p>Equipment needed:</p> <p>Compasses, protractors , rulers, mirrors, Sketchpad</p>		

Year 9	Minzc Level: 4 and 5	Constructions and 3D Shapes	Time: 3 Weeks
<p>Achievement Objectives:  g4(2) design the net &amp; make a simple polyhedron to specified dimensions;  g4(3) make a model of a solid object from diagrams which show views from the top, front, side, and back;  g5(4) construct circles, simple polygons, mediators, angle bisectors;  g5(6) make isometric drawings of 3D objects built out of blocks;</p>		<p>Essential Skills:  esPR8 design and make;</p>	<p>Text references:  <b>ALPHA</b>  Ch 20 p296 – 308 3D shapes</p>
<p><b>Checklist:</b>  Describe polygons - names and types e.g. irregular pentagon, isosceles trapezium  Describe circles - names of parts  Use drawing instruments (&amp; sketchpad) to construct triangles &amp; circles (review polygons),  bisectors of angles and sides  Design and construct nets for polyhedra  Make models of solid objects given views  Draw solid objects made from cubes - given views  - given models  - on squared paper  - on isometric paper</p>		<p>Mathematical Processes: 13  Report the results of mathematical explorations concisely and coherently.</p>	<p>Other resources:</p>
<p>Equipment needed:  Cardboard, scissors, compasses, isometric paper</p>			<p>“Achievement” Produce a drawing representing a 3D shape  Draw top, front and side views of a model made from cubes.  Draw a net &amp; making a model given the plan &amp; measurements.</p> <p>“Merit” Produce a representation of a simple 3D shape.  Making a model using cubes given front, top and side views.  Isometric drawings of a simple shape made of cubes.  Carry out simple constructions.  Constructing any triangle, angle bisector or perpendicular bisector.  Drawing a net and making a model given the measurements.</p> <p>“Excellence” Demonstrate an understanding of drawing techniques associated with geometry  More complicated isometric drawings.  Using constructions to draw a net and make a model.</p>
			<p>Other Comments:</p>

Year 9	Minzc Level: 4 and 5	Algebraic Patterns		Time: 2 Weeks
<p>Achievement Objectives:  a4(1) find rule, express in words  a5(1) generate pattern, find rule in words &amp; symbols  a4(2) use a rule to make predictions  a4(4) find &amp; justify word formula for situation  a5(2) generate a pattern from a rule  a5(7) combine like terms in expressions;</p>		<p>Essential Skills:  esl2 organise, analyse, synthesize, evaluate, and use information  esPR1 think critically, creatively, reflectively, and logically;</p>	<p>Text references:  <b>ALPHA</b>  Ch 22 p318 - 326 Formulas and patterns    <b>BETA</b>  Ch 22 p 303 - 312 Formulas and Substitution</p>	<p>Other resources:</p>
<p><u>Checklist:</u>  Continue linear number and picture sequences and describe a rule  Use difference tables to help analyse patterns and identify rules  Explain how / why a rule (in words) fits a practical situation  Write rules as mathematical (and English) sentences  Use a rule to predict a member of a sequence  Use substitution to show that an expression describes a linear pattern  Generate linear patterns (and make up situations to fit) given rules</p>		<p>Mathematical Processes:</p>	<p>“Achievement” Describe simple arithmetic or geometric patterns  Finding the next terms of arithmetic and geometric patterns  Writing a rule in symbols for linear patterns  Using substitution to select a rule which generates a pattern  Combining simple like terms  Substituting values into formulae</p>	
			<p>“Merit” Find terms in patterns  Writing a rule for a non-linear pattern  Using substitution to generate a pattern from a given rule  Substituting into more complicated formulae</p>	
			<p>“Excellence” Solve algebra problems using graphs &amp; manipulation  Finding the rule for more complex number patterns  Justifying that the rule holds  Plotting the points on a graph for an algebraic pattern  Writing a rule for a practical context</p>	
<p>Equipment needed:  Calculators, spreadsheets</p>			<p>Other Comments:</p>	

Year 9	Minzc Level: 4 and 5	Expand and Factorise		Time: 3 Weeks		
<p>Achievement Objectives:  a5(5) evaluate linear expressions by substitution  a5(7) combine like terms in expressions  a5(8) simplify algebraic fractions;  a5(9) factorise and expand expressions;</p>		<p>Essential Skills:  esN6 recognize and use numerical patterns and relationships  esPR3 identify, describe, and redefine a problem</p>	<p>Text references:  <b>ALPHA</b></p> <p>Ch 21 p309 - 317 Introducing expressions  Ch 23 p327 - 335 Working with expressions  Ch 23 p350 - 359 Expanding brackets and factorising</p>			
		<p>Mathematical Processes:</p>	<p><b>BETA</b></p> <p>Ch 23 p 313 – 324 Simplifying Expressions  Ch 24 p 325 - 329 Expanding and Factorising  Ch 26 p 347 – 355 Two pairs of brackets</p>			
		<p><u>Checklist:</u>  Define term, coefficient, exponent, variable  (include other words e.g. pronumeral, power)  Combine like terms (Algebraic addition and subtraction)  Algebraic multiplication and division (incl. simplifying algebraic fractions)  Expand single-bracket expressions  Factorise single-bracket expressions  Expand double-bracket expressions  Factorise double-bracket expressions</p>			<p>Other resources:</p>	
					<p>“Achievement” Carry out simple algebraic manipulations  Combining like terms in algebraic expressions  Simplifying algebraic fractions such as <math>14x / 7</math> and <math>10x^2 / 5x</math>  Expanding 1 bracket  Factorising expressions into 1 bracket  Carry out simple algebraic manipulations</p>	
			<p>“Merit” Carry out more complex algebraic manipulations  Expanding and factorising quadratics  Substituting into formulae involving fractions, indices or multiple variables  Combining terms involving more complicated powers  Carry out more complex algebraic manipulations</p>			
<p>Equipment needed:</p>			<p>Other Comments:</p>			

Year 9	Minzc Level: 4 and 5	Linear Equations		Time: 2 Weeks
<p>Achievement Objectives:  a4(5) solve simple linear equations such as <math>2x + 4 = 16</math>  a5(6) solve linear equations  a5(10) use equations to represent practical situations</p>		<p>Essential Skills:  esW1 work effectively, both independently and in groups  esW2 build on their own learning experiences, cultural backgrounds, and preferred learning styles;</p>	<p>Text references:  <b>ALPHA</b>  Ch 24 p336 - 349 Equations   <b>BETA</b>  Ch 25 p 330 - 346 Solving Equations</p>	
		<p>Mathematical Processes:</p>	<p>Other resources:</p>	
<p><u>Checklist:</u>  Write linear equations from practical situations  Solve linear equations (showing working by some method)  “substitution proof”  “change side change sign”  “line down the side”  Interpret the solutions of linear equations.</p>		<p>“Achievement” Solve simple equations  Solving linear equations of the form <math>b + 2 = 7</math> (1 step solutions)</p>		
		<p>“Merit” Solve linear equations  Expressing a linear relationship in words and solving the resulting equation  Solving simple linear equations involving 2 or more steps  Solving linear equations e.g. <math>2b + 7 = 17</math> (2 step)  Writing simple linear equations  Forming equations to represent practical situations where the situation is given in words  Solving linear equations with brackets, x on both sides or fractions  “Excellence” Solve algebra problems using graphs and Manipulation  Showing necessary steps and correct mathematical statements when solving equations  Solving linear equations with combinations of brackets, x on both sides, fractions  Substituting into non linear formulae and finding unknowns  Solving complex word problems, which could be related to another strand  Interpreting answers in context</p>		
<p>Equipment needed:  Calculators, spreadsheets</p>		<p>Other Comments:</p>		

Year 9	Minzic Level: 4 and 5	Linear Graphs	Time: 3 Weeks
<p>Achievement Objectives:</p> <p>a4(3) sketch &amp; interpret graphs (whole no grids) which rep. simple everyday situations</p> <p>a5(3) sketch &amp; interpret graphs which represent everyday situations</p> <p>a5(4) graph linear rules and interpret slope and intercept, integer co-ordinates</p> <p>a5(10) use equations to represent practical situations</p>		<p>Essential Skills:</p> <p>esN4 ... understand [and] analyse ... information presented in graphs...</p>	<p>Text references:</p> <p><i>ALPHA</i></p> <p>Ch 26 p360 - 372 Co-ordinates</p> <p>Ch 27 p373 - 390 2D Graphs</p> <p><i>BETA</i></p> <p>Ch 27 p 356 – 384 2D Graphs</p>
<p><u>Checklist:</u></p> <p>Graph linear rules using plotting points</p> <p>Graph linear rules using spreadsheets / graphics calculators, varying intercepts and gradients</p> <p>Sketch linear rules using gradient and intercept</p> <p>Sketch graphs representing everyday situations</p> <p>Interpret graphs representing everyday situations (including gradient and intercept)</p>		<p>Mathematical Processes:</p>	<p>Other resources:</p> <p>“Achievement” Plot and interpret simple graphs Interpreting simple relationships illustrated by points on a graph Plotting co-ordinate pairs on a full Cartesian graph Interpreting (simply) changes in value represented on a graph Identifying the y intercept from the linear graph Identifying the gradient from the graph (straight forward scale)</p> <p>“Merit” Interpret linear graphs Drawing a graph given the y intercept and gradient Finding the equations of horizontal and vertical lines Interpreting the meaning of x and y intercepts and gradient Reading the y intercept and gradient from formula Reading and interpreting negative gradients from graphs &amp; formulae</p> <p>“Excellence” Reading the gradient from a graph with a complex scale Finding the intersection of lines interpreted in context Relating the features of graphs to practical contexts e.g. changing slopes Finding the equation of a line in context</p>
<p>Equipment needed:</p> <p>Calculators, spreadsheets</p>			<p>Other Comments:</p>

Year 9	Minzc Level: 4 and 5	Probability		Time: 2 Weeks
<p>Achievement Objectives:  s5(10) determine theoretical problems of e.g. rolling die / drawing card  s5(12) find problems of given sequence, using tree diagrams.</p> <p>Checklist:  Give probabilities as words, fractions, decimals, perhaps ratios, %s  Determine theoretical probabilities  use idea of complementary probabilities  Predict &amp; test probabilities in experiments, interpret &amp; evaluate results  Find probabilities of sequences of events using trees</p>		<p>Essential Skills:  esPR9 test ideas and solutions, and make decisions on the basis of experience and supporting evidence;</p>	<p>Text references:  ALPHA  Ch 30 p436 - 441 [Surveys and] Exploring probabilities</p>	
		<p>Mathematical Processes:</p>	<p>Other resources:</p>	
		<p>“Achievement” Carry out a simple experiment and record results  Record results on a 5 point word scale  List sample space  Read outcomes from a probability tree  Write probability as fractions / decimals for a single event (cards, dice etc)</p>		
		<p>“Merit” Interpret results of experiment &amp; Determine probabilities  Complete tree diagram to determine sample space  Calculate probability from a table of data  Solve simple problems using complementary probabilities</p>		
		<p>“Excellence” Evaluate the results of an experiment and Solve theoretical probability problems  Compare results between experimental and theoretical probabilities  Draw tree, list all outcomes, determine problems (equally likely events)  Design, carry out and evaluate an experiment</p>		
<p>Equipment needed:  Coins (plastic), cards, dice (including polyhedral), opaque bags of counters etc</p>		<p>Other Comments:</p>		

Year 9	Minzc Level: 5	<b>Pythagoras and Trigonometry</b>		<b>Time: 2 Weeks</b>		
<p>Achievement Objectives:</p> <p>g5(5) find an unknown side in a right-angled triangle using scale drawing, Pythagoras' theorem, and appropriate trigonometric ratio;</p> <p>g6(2) find unknown angles &amp; lengths in practical problems which can be modelled by triangles, using scale drawing, angle prop's of triangles, Pythagoras' theorem, trigonometric ratios ...</p> <p>Checklist:</p> <p>Define hypotenuse, opposite &amp; adjacent sides, practice identifying them</p> <p>Calculate length of any side by Pythagoras</p> <p>Investigate trig ratios, define SOHCAHTOA memory triangles</p> <p>Calculate angles &amp; sides using trig ratios (including vector triangles) (Use memory triangles and algebraic manipulation methods)</p>		<p>Essential Skills:</p> <p>esSE4 adapt to new ideas, technologies, and situations;</p>	<p>Text references:</p> <p><i>BETA</i></p> <p>Ch 3 p 190 – 194 Geometry</p> <p>Ch 18 p 256 - 267 Pythagoras</p> <p>Ch 19 - 21 p 268 – 302 Trigonometry I, II, III</p>			
		<p>Mathematical Processes:</p>			<p>Other resources:</p>	
				<p>“Achievement” Find simple, unknown lengths of right-angled triangles from diagrams using trig ratios and Pythagoras</p> <p>Finding the hypotenuse using Pythagoras</p> <p>Finding opposite, adjacent and hypotenuse sides using trigonometry</p>		
				<p>“Merit” Find unknowns of right angled triangles from words &amp; diagrams using trig ratios and Pythagoras</p> <p>Solving word problems, given diagrams, using Pythagoras and trigonometry</p>		
				<p>“Excellence” Model 2-D situations to find unknowns of a right-angled triangle using trigonometry or Pythagoras</p> <p>Appropriate rounding</p> <p>Correct mathematical statements</p>		
<p>Equipment needed:</p>		<p>Other Comments:</p>				