

## 2005 MATHEMATICS CALENDAR

## YEAR 10 MATHEMATICS

### Term 1

### Term 2

### Term 3

### Term 4

31/1	<i>Geometry</i> <b>Bearings, Angles and Mapping</b>	M T W T F
7/2		M T W T F
14/2		M T W T F
21/2	<i>Geometry</i> <b>Pythagoras and Trigonometry</b>	M T W T F
28/2		M T W T F
7/3		M T W T F
14/3	NCEA Style Test Right Angled	M T W T F
21/3	<i>Measurement</i> <b>Perimeter, Area and Volume</b>	M T W T F
28/3		M T W T F
4/4		M T W T F
11/4	NCEA Style Test Measurement	M T W T

2/5	<i>Number</i> <b>Errors, Powers and Standard Form</b>	M T W T F
9/5		M T W T F
16/5		M T W T F
23/5	<i>Number</i> <b>Integers, Fractions and Decimals</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	<i>Number</i> <b>Percentages</b>	M T W T F
20/6		M T W T F
27/6		M T W T F
4/7	NCEA Style Test Number	M T W T F

25/7	<i>Statistics</i> <b>Data collection and Averages</b>	M T W T F
1/8		M T W T F
8/8		M T W T F
15/8	<i>Statistics</i> <b>Graphs and Reporting Results</b>	M T W T F
22/8		M T W T F
29/8	NCEA Style Test Statistics	M T W T F
5/9	<i>Probability</i> <b>Theory and Experiment</b>	M T W T F
12/9		M T W T F
19/9		M T W T F
4/4	NCEA Style Test Probability	M T W T F

10/10	<i>Geometry</i> <b>Transformations, Construction &amp; 3D</b>	M T W T F
17/10		M T W T F
24/10		M T W T F
31/10	NCEA Style Test Geometry	M T W T F
7/11	NCEA Style Test Number	M T W T F
14/11	NCEA Style Test Right Angled	M T W T F
21/11	<i>Measurement</i> <b>Practical tasks</b>	M T W T F
28/11		M T W T F
5/12		M T W T F
12/12		M T W T F

Year 10	Minzic Level: 4 and 5	Bearings, Angles and Mapping	Time: 3 Weeks
<p>Achievement Objectives:  g4(5) bearings / grid references  g5(1) parallel lines  g5(2), (9) polygons  g5(3) circle geom</p>	<p>Essential Skills:  esSE 6 self appraisal  esPH 4 sporting activity skill  esPR4 analyse problems from a variety of different perspectives (approaches to angle problems)  esW3 develop sound work habits</p>	<p>Text references:</p> <p><i>ALPHA</i></p> <p>Ch 14 p 206 – 228 Angles  Ch 18 p 261 – 276 Parallel Lines (including Bearings)</p> <p><i>BETA</i></p> <p>Ch 9 p 132 - 150 Angles  Ch 10 p 151 – 156 Circle Geometry  Ch 11 p 157 – 166 Polygons</p>	
<p>Attitudes and Values:  av1 honesty  av6 fairness</p>	<p>Mathematical Processes:  ps 5 appropriate use of equipment  cm 2 devise / follow instructions</p>	<p>Other resources:</p>	
<p>Checklist:</p> <p>Use a compass appropriately to navigate a course on a grid using bearings  Practical and theoretical compass work  Grid references  Drawing and measuring bearings – written and practical  Calculate sizes of angles in objects by using angle properties of parallel lines and the angle properties of polygons (reasons to be given).  Angle rules (point, line, vertically opposite, alternate, co-interior, corresponding [FUZX])  Polygons rules (tri sum, tri ext, quad sum, general int sum, ext sum)  Investigate angles, parallel lines with transversals, polygons (including exterior angles and lines of symmetry), to confirm angle rules  Use drawing instruments to construct circles (incl. parts)  Use the tangent / radius rule and the semicircle property  Calculate angle size using geometric reasoning</p>		<p>“Achievement” Solve simple angle problems  Use a protractor to find the size of unknown angles.  Calculate angles at a point, on a line, in a triangle, in a rectangle and on parallel lines. Reasons do not have to be specified.  Use bearings</p> <p>“Merit” Solve simple angle problems and give reasons  Use a protractor to solve bearings problems.  Solve one-step angle problems with reasons.  Two step angle problems - could include bearings  Simple circle geometry - angle in a semi-circle, angle between radius and tangent</p> <p>“Excellence” Calculate angles giving reasons  Solving two step angle problems with reasons.  Multi-step angle problems with reasons</p>	
<p>Equipment needed:  Compasses, protractors, rulers</p>		<p>Other Comments:</p>	

Year 10	Minzic Level: 5	Pythagoras and Trigonometry		Time: 4 Weeks
<p>Achievement Objectives:</p> <p>g5(5) find an unknown side in a right-angled triangle using scale drawing, Pythagoras' theorem, an appropriate trigonometric ratio;</p> <p>g5(7) solve practical problems which can be modelled, using vectors.</p> <p>g6(2) find unknown angles &amp; lengths in practical problems which can be by triangles, using scale drawing, angle prop's of triangles, Pythagoras' theorem, trigonometric ratios ...</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><u>Checklist:</u></p> <p>Define, calculate and draw vectors and vector triangle addition</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)</p> <p>(Use memory triangles and algebraic manipulation methods)</p>		<p>Mathematical Processes:</p>	<p>Other resources:</p>	
<p>Equipment needed:</p> <p>Calculators</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 sin, cos, tan of an angle &amp; inverse (e.g. <math>\sin 45^\circ</math> and <math>\sin^{-1} 0.7</math>)</p> <p>Finding opposite and adjacent sides using trig</p> <p>“Merit” Find unknowns of right angled triangles from words &amp; diagrams using trig ratios and Pythagoras</p> <p>Finding any side using Pythagoras or trig ratios</p> <p>Finding angles using trig ratios</p> <p>Solving word problems, given diagrams, using Pythagoras. and trig ratios</p> <p>Finding the length of a vector</p> <p>“Excellence” Model 2-D situations to find unknowns of a right-angled triangle using trig ratios or Pythagoras</p> <p>Logical solutions</p> <p>Appropriate rounding</p> <p>Correct mathematical statements</p> <p>Vector triangles</p> <p>Other Comments:</p>		

Year 10	Minzc Level: 4 and 5	Perimeter, Area and Volume		Time: 3 Weeks
<p>Achievement Objectives:</p> <p>m4(2) calculate perimeters of circles, rectangles, &amp; triangles, areas of rectangles, &amp; volumes of cuboids from measurements of length</p> <p>m5(1) find perimeters, areas, &amp; volumes of everyday objects (including irregular and composite shapes...)</p> <p>M5(2) design &amp; use models to solve practical measuring problems</p>		<p>Essential Skills:</p> <p>esN3 use calculators &amp; a range of measuring instruments confidently &amp; competently</p> <p>esPR10 evaluate processes and solutions.</p>	<p>Text references:</p> <p><i>BETA</i></p> <p>Ch 6 p 87 - 97 Area</p> <p>Ch 7 p 98 – 112 Volume and Surface area</p> <p>Ch 8 p 113 - 131 Circular Figures</p>	
<p><u>Checklist:</u></p> <p>Perimeters, areas, surface areas and volumes (PASAV's)</p> <p>Model everyday shapes by polygons and polyhedra, discuss limitations</p> <p>Calculate PASAV's of everyday objects that are modelled by polyhedra (including irregular and composite)</p> <p>Use sketchpad to measure lengths, areas and volumes</p> <p>Equipment needed:</p>		<p>Mathematical Processes:</p> <p>6 classify objects, numbers, and ideas</p>	<p>Other resources:</p>	
		<p>"Achievement" Solve simple measurement problems</p> <p>Use equipment to make measurements</p> <p>Use measurements in calculations and conversions</p> <p>Calculate perimeter and area of simple composite shapes in context</p> <p>Calculate area of trapezium using formula</p> <p>Area and circumference of circles</p> <p>Time calculations including use of information from timetables</p>		
		<p>"Merit" Solve measurement problems</p> <p>Calculation of perimeter, area and volume of harder composite shapes</p> <p>Calculation of surface area of prisms, pyramids</p> <p>Calculation of volumes of cones, spheres and pyramids</p> <p>Conversion between units of area and volume</p> <p>Sensible rounding</p> <p>Students may be expected to select a suitable model.</p> <p>Some models may be given for the student to select from.</p>		
		<p>"Excellence" Plan, carry out and evaluate a measuring task</p> <p>Explain the limitations of the model used - were there other shapes that would have been better for the problem?</p> <p>Other Comments:</p>		

Year 10	Minzc Level: 4 and 5	Errors, Powers and Standard Form	Time: 3 Weeks
Achievement Objectives: n5(1) standard form n5(2) rounding n5(3) roots	Essential Skills: esN1 accurate calculation esN2 estimation esSE10 develop a range of practical life skills, such as parenting, budgeting, consumer, transport, & household maintenance skills.	Text references: <i>BETA</i> Ch 1 p 1 - 21 Arithmetic Ch 4 p 59 – 71 Approximations and Standard form	
	Mathematical Processes:	Other resources:  “Achievement” Solve number problems Conversion of numbers into standard form and vice versa. Rounding to any number of decimal places or significant figures  “Merit” Solve number problems in context. Standard form Powers  “Excellence” Solve number problems involving several steps or reversing processes in context Limits of accuracy when reading a scale	
<u>Checklist:</u> Review powers and roots, rounding to decimal places, and introduce concept of significant figures and standard form			
Equipment needed:	Other Comments:		

Year 10	Minzc Level: 4 and 5	Integers, Fractions and Decimals	Time: 3 Weeks
Achievement Objectives: n5(6) integers n5(5), (7), (8) decimals n5(9) ratio		Essential Skills: esN1 accurate calculation esN2 estimation esSE10 develop a range of practical life skills, such as parenting, budgeting, consumer, transport, & household maintenance skills.	Text references: <i>BETA</i> Ch 3 p 36 – 58 Percentages and ratio
		Mathematical Processes:	
<u>Checklist:</u> Review factors and multiples, Applications of Integers, Fractions, Decimals and Ratios		“Achievement” Solve number problems Sharing a quantity in a given ratio Solving word problems involving integers and decimals	
		“Merit” Solve number problems in context. Ratio Fractions and mixed numbers	
		“Excellence” Solve number problems involving several steps or reversing processes in context	
		Equipment needed:	Other Comments:

Year 10	Minzc Level: 4 and 5	Percentages		Time: 3 Weeks
Achievement Objectives: n5(5), (7), (8) decimals and percentages m5(3) rates		Essential Skills: esN1 accurate calculation esN2 estimation esSE10 develop a range of practical life skills, such as parenting, budgeting, consumer, transport, & household maintenance skills.	Text references: <i>BETA</i> Ch 3 p 36 – 58 Percentages and ratio	
		Mathematical Processes:	Other resources:	
<u>Checklist:</u> Applications of Percentages , Rates and Ratios				
		“Achievement” Solve number problems Expressing one quantity as a percentage of another Finding a percentage of a quantity Increasing or decreasing a number by a given percentage Sharing a quantity in a given ratio		
		“Merit” Solve number problems in context. Increasing or decreasing by a given percentage Calculation of percentage change Ratio		
“Excellence” Solve number problems involving several steps or reversing processes in context Find any quantity given a percentage change Find cost price given selling price Find GST exclusive price given GST inclusive price				
Equipment needed:		Other Comments:		

Year 10	Minzc Level: 4 and 5	Data collection and Averages	Time: 3 Weeks
<p>Achievement Objectives:  s5(1) plan &amp; conduct statistical investigations of variables associated with different categories within a data set, or variations of variables over time;  s5(2) consider the variables of interest, identify the one(s) to be studied, and select and justify samples for collection  s5(3) find, &amp; authenticate by ref. to appropriate displays, data measures such as mean, median, mode, inter-quartile range, and range;</p>		<p>Essential Skills:  esN4 recognise, understand, analyse, and respond to information which is presented in mathematical ways, for example, in graphs, tables, charts, or percentages;  esN5 organise information to support logic and reasoning  esl1 identify, locate, gather, store, retrieve, &amp; process info from a range of sources</p> <p>Mathematical Processes:</p>	<p>Text references: :  <b>ALPHA</b>  Ch 29 p416 – 430 Working with Data</p> <p><b>BETA</b>  Ch 28 p 385 - 408 Collecting &amp; Interpreting Data  Ch 29 p 409 – 428 Working with Data: Averages &amp; Graphs</p> <p>Other resources:</p>
<p><b>Checklist:</b>  Review discrete / continuous data, surveys and sampling  Review finding averages, quartiles and ranges from lists and graphs  Review frequency tables, including grouped / continuous data  Use stats mode on calculator to find mean from lists  Calculate averages, quartiles and ranges from tables (including use of stats mode)  Use Spreadsheets' formulae and functions to analyse and graph data.</p>		<p>"Achievement" Carry out a statistical investigation involving data collected over time or the comparison of data  Collect data to investigate given question, display data appropriately, calculate mean, median, mode and range, write a conclusion  Make comments related to the investigation</p> <p>"Merit" Report on a statistical investigation  Evaluate statistical reports produced by others  Writing a question for exploration  Demonstrating an understanding of how to take a sample  "Excellence" Evaluate process used in carrying out investigation  Identifying bias in the sample taken</p>	
<p>Equipment needed:</p>		<p>Other Comments:</p>	

Year 10	Minzic Level: 4 and 5	Graphs and Reporting Results	Time: 3 Weeks
<p>Achievement Objectives:</p> <p>s5(3) find, &amp; authenticate by ref. to appropriate displays, data measures such as mean, median, mode, inter-quartile range, and range;</p> <p>s5(4) discuss discrete &amp; continuous numeric data in quality displays;</p> <p>s5(5) collect and display comparative samples in appropriate displays such as back-to-back stem-&amp;-leaf, box-&amp;-whisker, &amp; composite bar graphs.</p> <p>s5(6) use displays &amp; measures to compare data associated with diff categories</p>		<p>Essential Skills:</p> <p>esN4 recognise, understand, analyse, and respond to information which is presented in mathematical ways, for example, in graphs, tables, charts, or percentages;</p> <p>esN5 organise information to support logic and reasoning</p> <p>esI3 present information clearly, logically, concisely, and accurately;</p> <p>esSE2 manage time effectively;</p> <p>Mathematical Processes:</p>	<p>Text references: :</p> <p><b>ALPHA</b></p> <p>Ch 28 p391–415 Interpreting data &amp; statistical displays</p> <p>Ch 29 p416 – 430 Working with Data</p> <p><b>BETA</b></p> <p>Ch 28 p 385 - 408 Collecting &amp; Interpreting Data</p> <p>Ch 29 p 409 – 428 Working with Data: Averages &amp; Graphs</p>
<p><b>Checklist:</b></p> <p>Review discrete / continuous data, surveys and sampling</p> <p>Review finding averages, quartiles and ranges from lists and graphs</p> <p>Review frequency tables, including grouped / continuous data</p> <p>Use stats mode on calculator to find mean from lists</p> <p>Calculate averages, quartiles and ranges from tables (including use of stats mode)</p> <p>Use Spreadsheets' formulae and functions to analyse and graph data.</p>			<p>Other resources:</p> <p>“Achievement” Carry out a statistical investigation involving data collected over time or the comparison of data</p> <p>Calculating Statistics</p> <p>Displaying data appropriately</p> <p>Making sensible statements about statistics and graphs</p> <p>Commenting on different aspects about graphs</p> <p>“Merit” Report on a statistical investigation</p> <p>Evaluate statistical reports produced by others</p> <p>Displaying: time series data, 2 sets of univariate data, bivariate data</p> <p>Commenting on data displays</p> <p>Identifying factors that make graphs misleading</p> <p>Identifying seasonal variation &amp; long-term trends in time series graphs</p> <p>“Excellence” Evaluate process used in carrying out investigation</p> <p>Comment on features of time series graphs</p> <p>Identifying factors relating to time series graphs: seasonal variation, short term features, long term trend</p>
<p>Equipment needed:</p> <p>Computers</p>			<p>Other Comments:</p>

Year 10	Minzic Level: 4 and 5	Theory and Experiment		Time: 3 Weeks	
<p>Achievement Objectives:  s5(9) determine probability based on long-run relative frequency;  s5(10) determine theoretical probability e.g. rolling die / drawing card  s5(11) predict experiment outcome, test, explain results;  s5(12) find probability of given sequence, using tree diagrams.</p>		<p>Essential Skills:  esPR6 inquire and research, and explore, generate, and develop ideas (simulation)</p>	<p>Text references: :  <i>BETA</i>  Ch 30 p 429 - 444 Probability</p>		
<p><u>Checklist:</u>  Review performing experiments, record long-run relative frequencies  Review predicting results using theoretical probabilities  Use trees (completing or drawing) to calculate probabilities for sequences of events (including conditional)  Explain any difference between theoretical and experimental results  Carry out simulations, use the results, and describe simulations</p>		<p>Mathematical Processes:</p>	<p>Other resources:</p>		
<p>Equipment needed:  Computers, Coins (plastic), cards, dice (including polyhedral), opaque bags of counters etc</p>		<p>“Achievement” Determine probabilities for equally likely events  Complete tree diagram (equally likely events) &amp; determine probabilities  Calculate probabilities from 1xn contingency (simple multivariate) table  Carry out a simple simulation (instructions provided)  Calculate relative frequencies using the results of an experiment or simple statistical data  Carry out an experiment and find long-run relative frequencies    “Merit” Determine probabilities  Complete tree diagrams (non-equally likely events) &amp; determine probability  Draw tree diagrams for equally likely events &amp; determine probability  Calculate probability from 2xn contingency (simple multivariate) table  Interpret the results of an experiment or simulation  Interpret and make predictions from an experiment  Use the results of a simulation    “Excellence” Solve theoretical probability problems  Explain how to carry out a simple simulation  Draw tree diagrams &amp; determine probabilities (including conditional)  Evaluate the results of an experiment  Evaluate and justify results from an experiment</p>		<p>Other Comments:  Simulation is introduced at this level</p>	

Year 10	Minzc Level: 4 and 5	Transformations, Construction and 3-Dimensions		Time: 3 Weeks
<p>Achievement Objectives:</p> <p>g5(4) construct right angles, parallel lines, perpendicular lines, circles, simple polygons, medians, mediators, altitudes, angle bisectors;</p> <p>g5(6) make isometric drawings of 3D objects built out of blocks</p> <p>g6(4) explore and describe a locus formed in a practical situation. g5(8) recognise similar shapes, find scale factor, find unknown dimensions</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:</p> <p>esPR5 make connections and establish relationships</p> <p>esPR8 design and make</p>	<p>Text references: :</p> <p><i>BETA</i></p> <p>Ch 14 p 180 - 200      Transformations</p> <p>Ch 15 p 201 – 223      Enlargement</p>	
<p><u>Checklist:</u></p> <p>Describe translation (using vectors), reflection, rotation, enlargement</p> <p>Use drawing instruments and sketchpad to reflect, rotate, enlarge and translate objects</p> <p>Investigate the effects of moving mirror lines and centres of enlargements and rotations, and changing the vector for translation</p> <p>Use drawing instruments to:</p> <p>Construct things specified in g5(4)</p> <p>Draw face views of model solids made from cubes</p> <p>Draw solids made from cubes isometrically, from models or views</p> <p>Construct loci</p> <p>Construct 3D nets</p>		<p>Mathematical Processes:</p>	<p>“Achievement” Perform and describe simple transformations</p> <p>Drawing &amp; describing reflection, rotation, translation, enlargement</p> <p>Using scale factors to find unknown lengths</p> <p>Carry out simple constructions:</p> <p>Properties of regular polygons</p> <p>Constructions of any triangle given measurements</p> <p>Constructions of angle and line bisectors, simple polygons</p> <p>Drawing and describing simple locus e.g. goat on a chain</p> <p>Produce a drawing representing a three-dimensional shape</p> <p>Drawing a net for a prism, making a solid given the shape and size</p> <p>Drawing a 3 D shape from cubes on isometric paper</p> <p>Making a model using cubes, given top, front, side views</p>	
<p>Other resources:</p>		<p>“Merit” Perform and describe transformations.</p> <p>Drawing enlargements with negative scale factors</p> <p>Finding scale factors to find lengths and areas</p> <p>Identifying and describing transformations shown in a pattern</p> <p>Identifying invariant properties of transformations (in object / pattern)</p> <p>Produce a representation of a simple 3D shape.</p> <p>Making a complex model from given views</p> <p>Find least/most no. cubes for model, given top, front, side views</p> <p>Carry out constructions.</p> <p>Construction of parallel &amp; perpendicular lines thru. a point on a line</p> <p>Drawing a net for any solid given the shape and size</p>		
<p>Equipment needed:</p> <p>Drawing instruments, paper, card, ready-made patterns</p>		<p>Other Comments:</p>		

Year 10	Minzc Level: 5 and 6	Measurement		Time: 3 Weeks
Achievement Objectives: m5(1) find PASAV's of everyday objects (including irregular & composite) and state precision (limits) of answer n5(2) rounding		Essential Skills: esN1 accurate calculation esN2 estimation esN3 use calculators and a range of measuring instruments confidently and competently Mathematical Processes:	Text references: : <i>BETA</i> Ch 17 p 244 – 255 Three Dimensions Ch 4 p 59 – 71 Approximations and Standard form	
<u>Checklist:</u>		Other resources:		
		"Achievement" Calculation of speed Conversion of time measurements into decimals Use measurements in calculations and conversions		
		"Merit"		
Equipment needed: Computers, Coins (plastic), cards, dice (including polyhedral), opaque bags of counters etc		"Excellence"		
		Other Comments: Simulation is introduced at this level		