

Year 10 Mathematics Extension Program 2009

Teachers: Stephen Corcoran and Glen Prideaux Text: Nelson Maths for WA 10B Supplement lessons with Mathletics. (www.mathletics.com.au)

Term 1

Chapter 1: Number Study (3 weeks) (Number)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 1 Progress check	Chapter 1 Progress check	
1.1 Indices	Exercise 1.1	- Interactive tutorials 1.1a, b: Index laws - Additional exercise 1.1	Worksheet 1: Index laws	
1.2 Scientific notation	- Investigation: Large and small numbers - Exercise 1.2	- Interactive tutorials 1.2a, b: Scientific notation - Additional exercise 1.2	Worksheet 2: Scientific notation	
1.3 Operations with integers	Exercise 1.3	- Interactive tutorial 1.3a: BIMDAS - Teacher notes: Addition and subtraction - Interactive tutorial 1.3b: Addition and subtraction - Alternative method Example 15: Addition and subtraction - Teacher notes: Multiplication and division - Interactive tutorial 1.3c: Multiplication and division - TLF L585 Integer cruncher: addition and subtraction - Additional exercise 1.3	Worksheet 3: Operations with integers	

1.4 Rational numbers	- Investigation: Calculator messages - Exercise 1.4	- Interactive tutorial 1.4a: Recurring decimal $\rightarrow$ fraction - Interactive tutorial 1.4b: Addition of fractions - Interactive tutorial 1.4c: Subtraction of fractions - Alternative method: Subtraction of fractions - Teacher notes: Multiplication of fractions - Teacher notes: Division of fractions - Interactive tutorial 1.4d: Multiplication of decimals - Interactive tutorial 1.4e: Multiplication of decimals - Interactive tutorial 1.4f: Multiplication of fractions - Interactive tutorial 1.4g: Division of fractions - Additional exercise 1.4	Worksheet 4: Rational numbers	
1.5 Using numbers	Exercise 1.5	- Interactive tutorial 1.5: BMDAS including fractions - Additional exercise 1.5		
1.6 Surds	- Investigation: Finding roots - Exercise 1.6	- Alternative method Example 31: Simplifying surds - Interactive tutorial 1.6: Addition and subtraction of surds - Additional exercise 1.6	Worksheet 5: Surds	
Revision and consolidation	- Chapter 1 review - Project: Whole number problems			Test 1 (GP)

Chapter 2: Geometry (3 weeks) (Space)

Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 2 Progress check	Chapter 2 Progress check	
2.1 Two-dimensional shapes	Exercise 2.1	Additional exercise 2.1		
2.2 Angles, lines and circles	Exercise 2.2	- Interactive tutorial 2.2: Angle relationships - Additional exercise 2.2	- Worksheet 6: Angles in triangles and quadrilaterals - Worksheet 7: Angles on lines - Worksheet 8: Angles in circles	
2.3 Similarity and congruence	- Investigation: Angles and sides - Exercise 2.3	- Interactive tutorial 2.3: Similar triangles - Alternative method Example 11: Similar triangles - Alternative method Example 15: Solving similar triangles - TLF L2326 Trigonometry: measuring with triangles - Additional exercise 2.3	Worksheet 9: Similar and congruent triangles	
2.4 Transformations and symmetry	- Investigation: Creating quasi-tessellations - Exercise 2.4	- Interactive tutorial 2.4: Rotations - Teacher notes: Quasi-tessellations - Additional exercise 2.4		
2.5 Deductive geometry	Exercise 2.5	Additional exercise 2.5		

2.6 Three-dimensional shapes and nets	- Investigation: Conic sections - Exercise 2.6	- Teacher notes: Naming 3D shapes (includes an investigation) - Additional exercise 2.6		
2.7 Networks	- Investigation: Lines on spheres - Investigation: The Königsberg bridge problem - Exercise 2.7	- Interactive tutorial 2.7: Traversable networks - Additional exercise 2.7		
Revision and consolidation	- Chapter 2 review - Project: Making hedrons			Invest 1 (SC)
Chapter 3: Function Study (3 weeks) (Algebra)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 3 Progress check	Chapter 3 Progress check	
3.1 Expressions and formulas	- Investigation: Space stations - Exercise 3.1	- Teacher notes: Algebraic skills - Interactive tutorial 3.1: Transposing formulas - Additional exercise 3.1	Worksheet 10: Expressions and formulas	
3.2 Simplifying expressions	Exercise 3.2	- Interactive tutorial 3.2a: Distributive law - Interactive tutorial 3.2b: HCF - Additional exercise 3.2	Worksheet 11: Simplifying expressions	
3.3 Function notation	Exercise 3.3	- Interactive tutorial 3.3a: Functions - Interactive tutorial 3.3b: Ordered pairs - Additional exercise 3.3	Worksheet 12: Function notation	

3.4 Linear functions	• Technology: Linear functions with Excel • Technology: Linear functions with the ClassPad • Technology: Linear functions with the ClassPad • Exercise 3.4	• Spreadsheet: Linear functions • Additional exercise 3.4	• Worksheet 13: Linear functions	
3.5 Quadratic and other non-linear functions	• Investigation: Throwing balloons • Technology: Families of quadratic functions on the ClassPad • Investigation: The graphs of powers (on the ClassPad) • Exercise 3.5	• Additional exercise 3.5	• Worksheet 14: Graphing non-linear functions • Worksheet 15: Finding simultaneous solutions using graphs	
Revision and consolidation	• Chapter 3 review • Project: Function study		• Term 1 review: Chapters 1 to 3	Test 2 (SC)

Term 2

Chapter 4: Measurement (3 weeks) (Measurement and Space)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 4 Progress check	Chapter 4 Progress check	
4.1 Length and perimeter	Exercise 4.1	- Interactive tutorial 4.1a: Perimeter of a sector - Teacher notes: Proof of Pythagoras's theorem - Teacher notes: Pythagorean triples (triads) - Interactive tutorial 4.1b: Perimeter of a compound figure - Additional exercise 4.1	Worksheet 16: Length and perimeter	
4.2 Area	- Investigation: Finding areas of irregular shapes - Exercise 4.2	- Teacher notes: Area rules - Interactive tutorial 4.2: Area rules - TLF L2311 Measures: scaling down - Additional exercise 4.2	Worksheet 17: Area	
4.3 Nets and surface area	- Investigation: Surface areas of pyramids and cones - Exercise 4.3	- Interactive tutorial 4.3: SA of a closed cylinder - Additional exercise 4.3	Worksheet 18: Surface area	
4.4 Volume and capacity	- Investigation: Volume formulas - Exercise 4.4	- Interactive tutorial 4.4a: Unit conversion - Interactive tutorial 4.4b: Volume - TLF L165 What's in a cube: level 1 - TLF L166 What's in a cube: level 2 - Additional exercise 4.4	Worksheet 19: Volume and capacity	

4.5 Time	Exercise 4.5	- TLF L696 Earth rotation: night and day - Additional exercise 4.5	Worksheet 20: Time	
Revision and consolidation	- Chapter 4 review - Project: Measurement			Invest 2 (GP)
<i>Chapter 5: Ratio and variation (3 weeks) (Algebra and Number)</i>				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 5 Progress check	Chapter 5 Progress check	
5.1 Rates and ratios	Exercise 5.1	- Interactive tutorial 5.1a: Better buy - Alternative method Example 2: Using the opposite rate - Interactive tutorial 5.1b: Unitary method - TLF L2375 Biscuit factory: gears - TLF L2374 Biscuit factory: three-gear system - Additional exercise 5.1	Worksheet 21: Rates and ratios	
5.2 Direct proportion	- Investigation: Shoe size and height - Technology: Direct proportion on the ClassPad - Technology: Excel and direct proportion - Exercise 5.2	- Alternative method Example 9: Equivalent ratios - Alternative method Example 11: Direct proportion - Teacher notes: GC direct proportion - Interactive tutorial 5.2 Direct proportion - Spreadsheet: Direct proportion - Additional exercise 5.2	Worksheet 22: Direct proportion	

5.3 Inverse proportion	- Technology: Excel and inverse proportion - Technology: Inverse proportion on graphics calculator - Exercise 5.3	- Spreadsheet: Inverse proportion - Interactive tutorial 5.3: Inverse proportion - Teacher notes: GC inverse proportion - Additional exercise 5.3	Worksheet 23: Inverse proportion	
5.4 Joint variation and applications	Exercise 5.4	- Alternative method Example 23: Unitary method - Interactive tutorial 5.4a: Inverse variation application - Alternative method Example 24: Inverse variation - Interactive tutorial 5.4b: Joint variation application - Alternative method Example 26: Joint variation problems - Additional exercise 5.4	Worksheet 24: Joint variation and applications	
Revision and consolidation	Chapter 5 review			Test 3 (GP)
Chapter 6: Coordinate geometry (3 weeks)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 6 Progress check	Chapter 6 Progress check	
6.1 Points, distance and midpoints	Exercise 6.1	Additional exercise 6.1	- Worksheet 25: The distance formula - Worksheet 26: The midpoint formula	

6.2 Straight-line graphs	- Technology: Linear graphs on the ClassPad - Exercise 6.2	- Interactive tutorial 6.2: Does this point satisfy the line? - Additional exercise 6.2	Worksheet 27: Straight-line graphs and intercepts	
6.3 Gradients and equations	- Investigation: Equations of lines - Exercise 6.3	- Interactive tutorial 6.3: Gradient - Additional exercise 6.3	- Worksheet 28: Gradients - Worksheet 29: Equations of lines	
6.4 Parallel and perpendicular lines	Exercise 6.4	- Teacher notes: Perpendicular lines - Interactive tutorial 6.4: Equations of lines - Additional exercise 6.4	Worksheet 30: Parallel and perpendicular lines	
6.5 Coordinate geometry	- Investigation: Centre of a triangle - Exercise 6.5	Additional exercise 6.5	Worksheet 31: Equations of circles	
6.6 Quadratic and other models	- Technology: Parabolas on the ClassPad - Exercise 6.6	Additional exercise 6.6		
Revision and consolidation	- Chapter 6 review - Project: Geometric diversions		Term 2 review: Chapters 4 to 6	Sem 1 Exam (GP)

Term 3

Chapter 7: Chance and data (3 weeks) (Chance and Data)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 7 Progress check	Chapter 7 Progress check	
7.1 Collecting and displaying data	- Investigation: School travel - Exercise 7.1	- Teacher notes: Histograms and polygons - Teacher notes: Scatter graphs technology - Interactive tutorial 7.1: Tables - TLF L5862 Scatterplots: create your own data - Additional exercise 7.1	- Worksheet 32: Statistical tables - Worksheet 33: Frequency tables and graphs	
7.2 Using data measures	Exercise 7.2	- Interactive tutorial 7.2a: Statistical measures - Interactive tutorial 7.2b: Statistical measures (grouped data) - Additional exercise 7.2	Worksheet 34: Mode, median and mean	
7.3 Data variation and relationships	- Technology: Boxplot - Exercise 7.3	- Spreadsheet: Boxplot - Teacher notes: Box-and-whisker plots technology - Additional exercise 7.3	- Worksheet 35: Box-and-whisker plots - Worksheet 36: Stem-and-leaf plots	
7.4 Experimental probability	Exercise 7.4	- TLF L2635 Dice duel: fair or unfair? - TLF L2641 Dice duels - Additional exercise 7.4	Worksheet 37: Experimental probability	
7.5 Theoretical probability	Exercise 7.5	- Teacher notes: Theoretical probability - TLF L2639 Dice duels: lucky 16 game	- Worksheet 38: Sample spaces - Worksheet 39: Theoretical	

		Additional exercise 7.5	probability	
7.6 Combined probabilities	Exercise 7.6	- Interactive tutorial 7.6a: Probability tree diagrams - Interactive tutorials 7.6b, c: Multiplication principle - Additional exercise 7.6	- Worksheet 40: Tree diagrams - Worksheet 41: Combined probabilities	
Revision and consolidation	- Chapter 7 review - Project: Gambling odds	- Teacher notes: Betting slips - Teacher notes: Play money		Test 4 (GP)
<i>Chapter 8: Advanced algebra (3 weeks) (Algebra)</i>				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 8 Progress check	Chapter 8 Progress check	
8.1 The distributive law	Exercise 8.1	- Interactive tutorial 8.1: The distributive law - Additional exercise 8.1	Worksheet 42: The distributive law	
8.2 Binomial products	- Investigation: Binomial products - Exercise 8.2	- Interactive tutorial 8.2: Binomial products - Additional exercise 8.2	Worksheet 43: Expanding binomial products	
8.3 Factorisation using the distributive law	Exercise 8.3	- Interactive tutorial 8.3: HCF - Additional exercise 8.3	Worksheet 44: Factorisation	

8.4 Quadratic factorisation	Exercise 8.4	Additional exercise 8.4	- Worksheet 45: Factorising quadratic equations - Worksheet 46: Completing the square	
8.5 Algebraic fractions	Exercise 8.5	Additional exercise 8.5		
8.6 Operations with algebraic fractions	Exercise 8.6	Additional exercise 8.6		
8.7 Formulas	- Technology: Calculating values from formulas with the ClassPad - Exercise 8.7	Additional exercise 8.7		
Revision and consolidation	Chapter 8 review			Test 5 (SC)
Chapter 9: Trigonometry (4 weeks) (Space and Measurement)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 9 Progress check	Chapter 9 Progress check	
9.1 Pythagoras's theorem	Exercise 9.1	- Teacher notes: Proof of Pythagoras's theorem - Interactive tutorial 9.1: Perimeter involving Pythagoras's theorem - Additional exercise 9.1	Worksheet 47: Pythagoras's theorem	

9.2 Latitude, longitude and bearings	Exercise 9.2	Additional exercise 9.2	Worksheet 48: Nautical and aviation measures	
9.3 Trigonometric ratios	- Investigation: Trig ratios - Exercise 9.3	- Interactive tutorials 9.3a, b: Solving right triangles - Teacher notes: Special trig ratios - TLF L2335 Trigonometry: finding angles - TLF L2332 Trigonometry: using sine - TLF L2333 Trigonometry: using cosine - TLF L2331 Trigonometry: using tangent - Additional exercise 9.3	Worksheet 54: Calculating exact values of trigonometric functions	
9.4 Applications of trigonometric ratios	Exercise 9.4	Additional exercise 9.4	- Worksheet 49: Trigonometric ratios - Worksheet 50: Problem solving using trigonometry	
9.5 Area of a non-right angled triangle	- Investigation: Area of a hexagon - Exercise 9.5	Additional exercise 9.5	Worksheet 51: Areas of triangles	
9.6 The sine rule	Exercise 9.6	- Teacher notes: sine rule - Additional exercise 9.6	Worksheet 52: The sine rule	

9.7 The cosine rule	Exercise 9.7	- Teacher notes: cosine rule - Additional exercise 9.7	Worksheet 53: The cosine rule	
9.8 Mixed problems and applications	Exercise 9.8	Additional exercise 9.8		
9.9 3D applications	Exercise 9.9	Additional exercise 9.9		
9.10 Basic trigonometric graphs	Exercise 9.10	- Teacher notes: Basic trigonometric graphs - Additional exercise 9.10		
9.11 Trigonometric functions	Exercise 9.11	Additional exercise 9.11	- Worksheet 55: Sketching periodic functions – amplitude and period - Worksheet 56: Sketching periodic functions – phase and vertical shift - Worksheet 57: Sketching periodic functions	
Revision and consolidation	Chapter 9 review		Term 3 review: Chapters 7 to 9	Inv 3 (GP)

Term 4

Chapter 10: Money and business (2 weeks) (Number)				
Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 10 Progress check	Chapter 10 Progress check	
10.1 Budgets	- Investigation: Surviving on the dole - Exercise 10.1	- Interactive tutorial 10.1: Mobile phone costs - Additional exercise 10.1	Worksheet 58: Budgets	
10.2 Percentages	Exercise 10.2	- Interactive tutorial 10.2: Percentage - Alternative method Example 6: Percentage increase - Additional exercise 10.2	Worksheet 59: Percentages	
10.3 Business percentages	Exercise 10.3	- Interactive tutorial 10.3: Wage calculation - Alternative method Example 9: Original price - Additional exercise 10.3	Worksheet 60: Percentages in business	
10.4 Simple and compound interest	- Technology: Mortgages - Exercise 10.4	- Interactive tutorial 10.4a: Monthly repayments - Interactive tutorial 10.4b: Compound interest - Spreadsheet: Mortgages - Additional exercise 10.4	Worksheet 61: Simple interest and loans	
Revision and consolidation	- Chapter 10 review - Project: Travel budget			Test 6 (SC)

Chapter 11: Advanced equations (5 weeks) (Algebra)

Contents	Text Resources	CD-ROM Resources	Teacher Pack Resources	Assessments
Assessment of prior learning		Chapter 11 Progress check	Chapter 11 Progress check	
11.1 Expressions and equations	Exercise 11.1	Additional exercise 11.1	Worksheet 62: Substitution	
11.2 Linear equations	- Investigation: Backtracking - Exercise 11.2	- Interactive tutorial 11.2a: Solving equations with brackets - Interactive tutorial 11.2b: Solving equations with fractions - Interactive tutorial 11.2c: Solving worded problems - Additional exercise 11.2	- Worksheet 63: Solving written equations - Worksheet 64: Solving equations - Worksheet 65: Solving equations with brackets - Worksheet 66: Solving equations with fractions	
11.3 Quadratic equations	Exercise 11.3	Additional exercise 11.3	- Worksheet 67: Solving quadratic equations - Worksheet 68: The quadratic formula	
11.4 Simultaneous equations	- Technology: Simultaneous equations - Exercise 11.4	- Interactive tutorial 11.4a: Substitution method - Interactive tutorial 11.4b: Elimination method - Additional exercise 11.4	Worksheet 69: Simultaneous equations	

11.5 Exponential models of growth and decay	• Technology: Exponential regression on the ClassPad • Technology: Investigating exponential graphs • Investigation: AIDS epidemic • Exercise 11.5	• Additional exercise 11.5		
Revision and consolidation	• Chapter 11 review • Project: Algebraic diversions		• Term 4 review: Chapters 10 to 11	Sem 2 Exam (SC)