Lesson Plans

Year 9 Mathematics TERM 2

Some general points about the following lesson plans:

- ★ The lesson plans outline only one way of sequencing the learning material in each chapter of the textbook.
- ★ The content and sequence will obviously vary from class to class (The following guide is ambitious in many instances).
- ★ All activities and investigations in each chapter have been deliberately designed to support the National Curriculum content whilst keeping in mind the development and reinforcement of skills required in the study of mathematics in Year 11/12.
- ★ The length of lessons vary from school to school and even within schools. The following guide is based on 35/40 min lessons because it was reasoned that adjustment to 60/75/90 mins lessons would be easier than reducing lesson plans.
- ★ Students may be challenged further by completing each chapter Task, Competition Questions, and by finding and entering any of the many competitions, challenges, projects etc that may be found on the Internet. Such students may benefit by doing an Internet search early in the year and planning entries before they close.

Assessment

A task	7th week of Term
Mental computation	Last week of Term
End of Term Test	Last week of Term

Summary of Term 1 Lessons (10 weeks)

Chapter 6	Proportion	Number & Algebra - Real Numbers	2 weeks
Chapter 7	Pythagoras	Measurement & Geometry - Pythagoras & Trig	2 weeks
Chapter 8	Geometry	Measurement & Geometry - Geometric Reas.	2 weeks
Chapter 9	Statistics	Statistics & Probability - Data representation	2 weeks
Chapter 10	Review		2 weeks

Note: The workprogram contains a detailed mapping of curriculum content.

Year 9 Level Description

The proficiency strands Understanding, Fluency, Problem Solving and Reasoning are an integral part of mathematics content across the three content strands: Number and Algebra, Measurement and Geometry, and Statistics and Probability. The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They provide the language to build in the developmental aspects of the learning of mathematics.

At this year level:

- **Understanding** includes describing the relationship between graphs and equations, simplifying a range of algebraic expressions, explaining the function of relative frequencies and probabilities, calculating areas of shapes and surface areas of prisms and the constancy of the trigonometric ratios for right-angle triangles.
- **Fluency** includes applying the index laws to expressions with integer indices, expressing numbers in scientific notation, listing outcomes for experiments and developing familiarity with calculations involving the Cartesian plane.
- **Problem Solving** includes calculating surface areas and volumes of right prisms, applying ratio and scale factors to similar figures, solving problems involving right-angle trigonometry, and collecting data from secondary sources to investigate an issue.
- **Reasoning** includes following mathematical arguments, evaluating media reports and using statistical knowledge to draw conclusions, developing strategies in investigating similarity and sketching linear graphs**.**

Year 9 Content Description

Chapter 6 Proportion (Number & Algebra ➡ Real Numbers)

★ Solve problems involving direct proportion.
★ Explore the relationship between graphs and equations corresponding to simple rate problems.
★ Understand the difference between direct and inverse proportion, identifying these in real-life contexts and using these relationships to solve problems.

Chapter 7 Pythagoras (Measurement & Geometry ➡ Pythagoras & Trigonometry)

★ Investigate Pythagoras' Theorem and its application to solving simple problems involving right-angled triangles.
★ Understand that Pythagoras' Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications.
★ Recognise that right-angled triangle calculations may generate results that can be integral, fractional or irrational numbers known as surds.

Chapter 8 Geometry (Measurement & Geometry ➡ Geometric Reasoning)

★ Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar.
★ Solve problems using ratio and scale factors in similar figures.

Chapter 9 Statistics (Statistics and Probability ➡ Data Representation and Interpretation)

★ Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources.
★ Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal'.
★ Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread.

Chapter 10 Review

★ Review of all of above.

Chapter 6 Proportion (Number & Algebra ➡ Real Numbers) 2 weeks

★ Solve problems involving direct proportion.
★ Explore the relationship between graphs and equations corresponding to simple rate problems.
★ Understand the difference between direct and inverse proportion, identifying these in real-life contexts and using these relationships to solve problems.

2 weeks	Method	Resources
1	Purpose of chapter Warm-up Exercise 6.1 p74 HW: Read and practice the Sweet Trick on p85	
2	Exercise 6.2, 6.3 p75 Some students demonstrate the Sweet Trick p85 HW: Complete Exercises and demonstrate Sweet Trick at home/lodgings	
3	Discussion about Sweet Trick - how to improve presentation Proportion. Exercise 6.4 p76 HW: Complete Exercises	
4	Exercise 6.5 p77 (Model solutions) Direct proportion. Exercise 6.6 p78 (Model solutions) HW: Complete exercises	graph paper
5	Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique Mental computation Exercise 6.10 p82 Direct proportion. Exercise 6.7 p79 (Model solutions) Inverse proportion. Exercise 6.8 p80 (Model solutions) HW: Complete exercises.	
6	Mental computation Exercise 6.11 p82 Exercise 6.9 p81 Competition Questions p83 HW: Complete exercises	
7	Mental computation Exercise 6.12 p82 Group work working on a choice/directed/combination of: Investigation 6.1, 6.2 p84 A game p85 Technology 6.1, 6.2, 6.3, 6.4 p86 HW: A couple of puzzles p85	compasses graph paper calculators spreadsheets Internet
8	Group work working on a choice/directed/combination of: Investigation 6.1, 6.2 p84 A game p85 Technology 6.1, 6.2, 6.3, 6.4 p86	compasses graph paper calculators spreadsheets Internet
9	Chapter Review 1 p87 HW: Complete Chapter Review	
10	Chapter Review 2 p88 HW: Complete Chapter Review	

Chapter 7 Pythagoras (Measurement & Geometry ➡ Pythagoras & Trigonometry)

- ★ Investigate Pythagoras' Theorem and its application to solving simple problems involving right-angled triangles.
- ★ Understand that Pythagoras' Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications.
- ★ Recognise that right-angled triangle calculations may generate results that can be integral, fractional or irrational numbers known as surds.

Lesson	Method	Resources
1	☐ Purpose of chapter. ☐ Exercise 7.1 p90 (Model activities for students) ☐ HW: Read and practice the Sweet Trick on p100	string ruler, protractor pins tape measure
2	☐ Exercise 7.2 p91 (Model solutions) ☐ Exercise 7.3 p92 (Model solutions) ☐ Some students demonstrate the Sweet Trick p100 ☐ HW: Complete Exercises and demonstrate Sweet Trick at home/lodgings	calculators
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Exercise 7.4 p93 (Model solutions) ☐ Competition Questions p97 Q1-4 ☐ HW: Complete Exercises	graph paper
4	☐ Exercise 7.5 p94 (Model solutions) ☐ HW: Complete exercise	
5	☐ Exercise 7.6 p95 (Model solutions) ☐ Competition Questions p97 Q1-4 ☐ HW: Complete exercises	
6	☐ Mental computation Exercise 7.7 p96 Group work working on directed/choice/combination of: ☐ Investigations 7.1, 7.2, 7.3 p98 ☐ A game p100 ☐ Technology 7.1, 7.2, 7.3, 7.4 p99 ☐ HW: A couple of puzzles p100	computers calculators Internet
7	☐ Mental computation Exercise 7.8 p96 Group work working on directed/choice/combination of: ☐ Investigations 7.1, 7.2, 7.3 p98 ☐ A game p100 ☐ Technology 7.1, 7.2, 7.3, 7.4 p99 ☐ HW: A couple of puzzles p100	computers calculators Internet
8	☐ Mental computation Exercise 7.9 p96 ☐ Competition Questions p97 (Model solutions)	
9	☐ Chapter Review 1 p101 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p102 ☐ HW: Complete Chapter Review	

Chapter 8 Geometry (Measurement & Geometry ➡ Geometric Reasoning) 2 weeks

★ Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar.
★ Solve problems using ratio and scale factors in similar figures.

Lesson	Method	Resources
1	Purpose of chapter. Exercise 8.1 p104 Exercise 8.2 p105 HW: Read and practice the Sweet Trick on p116 and complete exercises	
2	Exercises 8.3 p106 Some students demonstrate the Sweet Trick p116 HW: Complete Exercises and demonstrate Sweet Trick at home/lodgings	rulers
3	Discussion about Sweet Trick - how to improve presentation Exercise 8.4 p107 (Model solutions) HW: Complete exercise	graph paper rulers
4	Exercise 8.5 p108 & 109 HW: Complete exercise	
5	Exercise 8.6 p110 (Model solutions) Exercise 8.7 p111 (Model solutions) HW: Complete exercises	
6	Mental computation Exercise 8.8 p112 Competition Questions p113 (Model solutions) HW: Complete Competition Questions	
7	Mental computation Exercise 8.9 p112 Group work working on a directed/choice/combination of: Investigations 8.1, 8.2, 8.3 p115 Technology 8.1, 8.2 p114 A Game p116	cartoon drawing materials Internet
8	Mental computation Exercise 8.9 p112 Group work working on a directed/choice/combination of: Investigations 8.1, 8.2, 8.3 p115 Technology 8.1, 8.2 p114 A Game p116 HW: A couple of puzzles p116	cartoon drawing materials Internet
9	Chapter Review 1 p117 HW: Complete Chapter Review	
10	Chapter Review 2 p118 HW: Complete Chapter Review	

Chapter 9 Statistics (Statistics and Probability ➡ Data Representation and Interpretation)

- ★ Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly from secondary sources.
- ★ Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal'.
- ★ Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread.

Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 9.1 p120 ☐ Exercise 9.2 p120 ☐ Exercise 9.3 p121 ☐ HW: Read and practice the Sweet Trick on p131, complete exercises	
2	☐ Exercise 9.4 p121 ☐ Stem & Leaf Plots Exercise 9.5 p122 (Model solutions) ☐ Some students demonstrate the Sweet Trick p131 ☐ HW: Complete exercise and demonstrate Sweet Trick at home/lodgings	
3	☐ Exercise 9.6 p123 ☐ Histograms. Exercise 9.7 p124 ☐ HW: Complete exercises	
4	☐ Exercise 9.8 p125 ☐ Exercise 9.9 p126 ☐ HW: Complete above exercises	
5	☐ Exercise 9.10 p127 ☐ HW: Complete above exercise	
6	☐ Mental computation Exercise 9.11 p128 ☐ Competition Questions p129 (Model solutions) ☐ HW: Complete Competition Questions	
7	☐ Mental computation Exercise 9.12 p128 Group work working on a directed/choice/combination of: ☐ Investigations 9.1, 9.2, 9.3 p130 ☐ Technology 9.1, 9.2, 9.3, 9.4 p132 ☐ A Game p131 ☐ HW: A couple of puzzles p131	Internet spreadsheets Graphics calc.
8	☐ Mental computation Exercise 9.13 p128 Group work working on a directed/choice/combination of: ☐ Investigations 9.1, 9.2, 9.3 p130 ☐ Technology 9.1, 9.2, 9.3, 9.4 p132 ☐ A Game p131	
9	☐ Chapter Review 1 p133 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p134 ☐ HW: Complete Chapter Review	

A Task

Work on one of the four tasks at the beginning of each chapter.
(Page 73, page 89, page 103, page 119)

Lesson	Method	Resources
1-5	☐ Setup ☐ Decide whether tasks completed individually, groups of two, three, or four ☐ Decide which tasks are assigned to individuals/groups ☐ Decide how tasks are to be presented: Oral presentation, poster presentation (on classroom wall), power point presentation etc. ☐ If the presentation will take class time then decide when. ☐ Each lesson may be started with a mental computation or a summary of what is expected from the work on the tasks.	Textbook Assesssment instruments

Chapter 10 Review

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Lesson	Method	Resources
1-10	☐ Purpose of Review ☐ Review 1 p136 ☐ Review 2 p139 ☐ Repetition of above until mastery? ☐ Sample end of term papers (www.drdwyer.com.au) ☐ Assessment	Textbook Assesssment instruments