Lesson Plans

Year 9 Mathematics TERM 3

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 guides.
- ★ 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 some of them 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 3 Lessons (10 weeks)

Chapter 11	Indices 2	Number & Algebra - Real Numbers Measurement & Geometry - Units of Measmnt	2 weeks
Chapter 12	Trigonometry 1	Measurement & Geometry - Pythag & Trig	2 weeks
Chapter 13	Volume	Measurement & Geometry - Units of Measmnt	2 weeks
Chapter 14	Probability	Statistics & Probability - Chance	2 weeks
Chapter 15	Review	Review all of above	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 11 Indices 2 Number & Algebra - Real Numbers 2 weeks
Measurement & Geometry - Units of Measmnt

★ Express numbers in scientific notation.
★ Understand that the use of index notation is an efficient way of representing numbers and symbols and has many applications, particularly in science.
★ Represent extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals.
★ Apply index laws to numerical expressions with integer indices.
★ Apply knowledge of index laws to algebraic terms and simplify algebraic expressions, using both positive and negative integral indices.
★ Investigate very small and very large time scales and intervals.
★ Investigate the usefulness of scientific notation in representing very large and very small numbers.

Chapter 12 Trigonometry 1 Measurement & Geometry - Pythag & Trig 2 weeks

★ Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles.
★ Develop an understanding of the relationship between the corresponding sides of similar right-angled triangles.
★ Apply trigonometry to solve right-angled triangle problems.
★ Understand the terms 'adjacent' and 'opposite' sides in a right-angled triangle.

Chapter 13 Volume Measurement & Geometry - Units of Measmnt 2 weeks

★ Calculate the volume of cylinders and solve related problems.
★ Solve problems involving the volume of right prisms.
★ Build on the understanding of volume to become fluent with calculation, and identify that volume relationships are used in the workplace and everyday life.

Chapter 14 Probability Statistics & Probability - Chance 2 weeks

★ List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays.
★ Assign probabilities to outcomes and determine probabilities for events.
★ Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or'.
★ Posing 'and', 'or', 'not' and 'given' probability questions about objects or people.
★ Collect data to answer the questions using Venn diagrams or two-way tables.

Chapter 15 Review

★ Review all of above

Chapter 11 Indices 2 **Number & Algebra - Real Numbers** **2 weeks**
Measurement & Geometry - Units of Measmnt

- ★ Express numbers in scientific notation.
- ★ Understand that the use of index notation is an efficient way of representing numbers and symbols and has many applications, particularly in science.
- ★ Represent extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals.
- ★ Apply index laws to numerical expressions with integer indices.
- ★ Apply knowledge of index laws to algebraic terms and simplify algebraic expressions, using both positive and negative integral indices.
- ★ Investigate very small and very large time scales and intervals.
- ★ Investigate the usefulness of scientific notation in representing very large and very small numbers.

Lesson	Method	Resources
1	□ General (covering book, ruling pages, paste study guide etc.) □ Purpose of chapter □ Exercise 11.1, 11.2, 11.3, 11.4 p144 □ Index Law 1 Exercise 11.5 p145 □ HW: Read and practice the Sweet Trick on p155	
2	□ Index Law 2 Exercise 11.6 p145 □ Index Law 3 Exercise 11.7 p146 □ Index Law 4 Exercise 11.8 p146 □ Some students demonstrate the Sweet Trick p155 □ HW: Complete Exercises and demonstrate Sweet Trick at home/lodgings	
3	□ Discussion about Sweet Trick - how to improve presentation □ Index law 5 Exercise 11.9 p147 (Model solutions) □ Scientific Notation Exercise 11.10 p148 (Model solutions) □ HW: Complete Exercises	
4	□ Exercise 11.11 p148 (Model solutions) □ Exercise 11.12 p149 (Model solutions) □ Exercise 11.13 p149 (Model solutions) □ HW: Complete exercises	
5	□ Exercise 11.14 p150 (Model solutions) □ Exercise 11.15 p151 (Model solutions) □ HW: Complete exercises	
6	□ Mental computation Exercise 11.16 p152 Group work working on a directed/choice/combination of: □ Investigation 11.1, 11.2, 11.3 p154 □ A game p155 - (play the game a couple of times, determine a strategy) □ Technology 11.1, 11.2, 11.3 p156 □ HW: A couple of puzzles p155	Calculators Internet Computers
7	□ Mental computation Exercise 11.17 p152 Group work working on a directed/choice/combination of: □ Investigation 11.1, 11.2, 11.3 p154 □ A game p155 - (play the game a couple of times, determine a strategy) □ Technology 11.1, 11.2, 11.3 p156	Calculators Internet Computers
8	□ Mental computation Exercise 11.18 p152 □ Competition Questions p153 (Model solutions) □ HW: Complete Competition Questions	
9	□ Chapter Review 1 p157 □ HW: Complete Chapter Review	
10	□ Chapter Review 2 p158 □ HW: Complete Chapter Review	

Chapter 12 Trigonometry 1 Measurement & Geometry - Pythag & Trig 2 weeks

★ Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles.
★ Develop an understanding of the relationship between the corresponding sides of similar right-angled triangles.
★ Apply trigonometry to solve right-angled triangle problems.
★ Understand the terms 'adjacent' and 'opposite' sides in a right-angled triangle.

Lesson	Method	Resources
1	Purpose of chapter Exercise 12.1, p160 Exercise 12.2 p161 HW: Read and practice the Sweet Trick on p170	
2	Exercise 12.3 p162 Exercise 12.4 p163 Some students demonstrate the Sweet Trick p170 HW: Complete Exercises and demonstrate Sweet Trick at home/lodgings	
3	Discussion about Sweet Trick - how to improve presentation The tan ratio. Exercise 12.5 p164 (Model solutions) Exercise 12.6 p165 (Model solutions) HW: Complete exercises	
4	Exercise 12.7 p166 (Model solutions) HW: Complete exercise	
5	Exercise 12.8 p167 (Model solutions) HW: Complete exercise	
6	Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique Mental computation Exercise 12.9 p168 Investigations 12.1, 12.2, 12.3 p171 A game p170 Technology 12.1 p172	
7	Mental computation Exercise 12.10 p168 Group work working on a directed/choice/combination of: Investigations 12.1, 12.2, 12.3 p171 A game p170 Technology 12.1 p172 HW: A couple of puzzles p170	Internet computers protractor straws
8	Mental computation Exercise 12.11 p168 Competition Questions p169 (Model solutions) HW: Complete Competition Questions	
9	Chapter Review 1 p173 HW: Complete Chapter Review	
10	Chapter Review 2 p174 HW: Complete Chapter Review	

Chapter 13 Volume Measurement & Geometry - Units of Measmnt 2 weeks

★ Calculate the volume of cylinders and solve related problems.
★ Solve problems involving the volume of right prisms.
★ Build on the understanding of volume to become fluent with calculation, and identify that volume relationships are used in the workplace and everyday life.

Lesson	Method	Resources
1	Purpose of chapter Exercise 13.1 p176 HW: Read and practice the Sweet Trick on p185	
2	Exercise 13.2 p177 Some students demonstrate the Sweet Trick p185 HW: Complete Exercise and demonstrate Sweet Trick at home/lodgings	
3	Discussion about Sweet Trick - how to improve presentation Exercise 13.3 p178 Exercise 13.4 p179 HW: complete exercises	
4	Exercise 13.5 p180 (Model solutions) HW: Complete exercise	
5	Mental computation Exercise 13.7 p182 Exercise 13.6 p181 (Model solutions) HW: Complete exercise	
6	Mental computation Exercise 13.8 p182 Group work working on a directed/choice/combination of: Investigation 13.1, 13.2, 13.3, 13.4 p184 Technology 13.1, 13.2, 13.3 P186 A game p185 HW: A couple of puzzles p185	centicubes Internet
7	Mental computation Exercise 13.9 p182 Group work working on a directed/choice/combination of: Investigation 13.1, 13.2, 13.3, 13.4 p184 Technology 13.1, 13.2, 13.3 P186 A game p185	
8	Competition Questions p183 (Model solutions) HW: Complete Competition Questions	
9	Chapter Review 1 p187 HW: Complete Chapter Review	
10	Chapter Review 2 p188 HW: Complete Chapter Review	

Chapter 14 Probability Statistics & Probability - Chance 2 weeks

★ List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays.
★ Assign probabilities to outcomes and determine probabilities for events.
★ Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or'.
★ Posing 'and', 'or', 'not' and 'given' probability questions about objects or people.
★ Collect data to answer the questions using Venn diagrams or two-way tables.

Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 14.1 p190 ☐ Exercise 14.2 p191 ☐ HW: Read and practice the Sweet Trick on p202	
2	☐ Some mental practice of the Sweet Trick ☐ Exercise 14.3 p192 ☐ Some students demonstrate the Sweet Trick p202 ☐ HW: Complete Exercise and demonstrate Sweet Trick at home/lodgings	dice
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Exercise 14.4 p193 ☐ HW: Complete exercise	dice
4	☐ Exercise 14.5 p194 (Model solutions) ☐ Exercise 14.6 p195 (Model solutions) ☐ HW: Complete exercises	
5	☐ Exercise 14.7 p196 ☐ Exercise 14.8 p197 ☐ HW: Complete exercises	
6	☐ Mental computation Exercise 14.9 p198 Group work working on a directed/choice/combination of: ☐ Investigation 14.1, 14.2, 14.3, 14.4 p200 ☐ Technology 14.1, 14.2, 14.3 p201 ☐ A game p202 ☐ HW: A couple of puzzles p202	Internet spreadsheet coins dice
7	☐ Mental computation Exercise 14.10 p198 Group work working on a directed/choice/combination of: ☐ Investigation 14.1, 14.2, 14.3, 14.4 p200 ☐ Technology 14.1, 14.2, 14.3 p201 ☐ A game p202	
8	☐ Mental computation Exercise 14.11 p198 ☐ Competition Questions p199 (Model solutions) ☐ HW: Complete Competition Questions	
9	☐ Chapter Review 1 p203 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p204 ☐ HW: Complete Chapter Review	

A Task

Work on one of the four tasks at the beginning of each chapter.
(Page 143, page 159, page 175, page 189)

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 15 Review

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Lesson	Method	Resources
1-10	☐ Purpose of Review ☐ Review 1 p206 ☐ Review 2 p209 ☐ Repetition of above until mastery? ☐ Sample end of term papers (www.drdwyer.com.au) ☐ Assessment	Textbook Assesssment instruments