Lesson Plans

Year 8 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	Ratio & Rate	Number & Algebra - Real Numbers	2 weeks
Chapter 12	Linear Equations	Number & Algebra - Linear & Non-linear	2 weeks
Chapter 13	Data	Statistics & Probability - Data Representation	2 weeks
Chapter 14	Time	Measurement & Geometry - Units of Measmnt	2 weeks
Chapter 10	Review	Review all of above	2 weeks

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

Year 8 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 patterns in uses of indices and repeating decimals, identifying commonalities between operations with algebra and arithmetic, connecting rules of relations and functions and their graphs, explaining the function of statistical measures, and contrasting measurements of perimeter and area.
- **Fluency** includes calculating accurately with simple decimals, indices and integers, recognising equivalence of common decimals and fractions including repeating decimals, factorising and simplifying basic algebraic expressions, evaluating perimeters, areas and volumes of common shapes, and calculating the mean and median of small sets of data.
- **Problem Solving** includes formulating and modelling, with comparisons of ratios, profit and loss, authentic situations involving areas and perimeters of common shapes and analysing and interpreting data using two-way tables.
- **Reasoning** includes justifying the result of a calculation or estimation as reasonable, explaining formal and intuitive use of ratios for comparing rates and prices, deriving one probability from its complement, using congruence to deduce properties of triangles, and making inferences about data.

Year 8 Content Description

Chapter 11 Ratio & Rate (Number & Algebra ➡ Real Numbers)
- ★ Use percentages to solve problems, including those involving mark-ups, discounts, profit and loss and GST.
- ★ Express profit and loss as a percentage of cost or selling price, compare the difference.
- ★ Investigate the methods used in retail stores to express discounts.
- ★ Solve a range of problems involving rates and ratios, with and without digital technologies
- ★ Understand that rate and ratio problems can be solved using fractions or percentages and choosing the most efficient form to solve a particular problem.
- ★ Calculate population rates in Australia and Asia and explain their difference.

Chapter 12 Linear Equations (Number & Algebra ➡ Linear & Non-linear Relationships)
- ★ Solve linear equations using algebraic and graphical techniques.
- ★ Use variables to symbolise simple linear equations and use a variety of strategies to solve them.
- ★ Solve equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation.

Chapter 13 Data (Statistics & Probability ➡ Data Representation)
- ★ Explore the practicalities and implications of obtaining representative data.
- ★ Understand that making decisions and drawing conclusions based on data may differ from those based on preferences and beliefs.
- ★ Explore the variation of means and proportions in representative data.
- ★ Investigate an international issue where media reporting and the use of data reflects different cultural or social emphases.
- ★ Use sample properties to predict characteristics of the population.

Chapter 14 Time (Measurement & Geometry ➡ Units of Measurement)
- ★ Solve problems involving duration, including using 12-hour and 24-hour time within a single time zone.
- ★ Calculate travel times given the start and finish time in 12-hour and 24-hour time including where the start and end time are in different time zones.
- ★ Identify regions in Australia and countries in Asia that are in the same time zone.

Chapter 15 Review
- ★ Review all of above

Chapter 11 Ratio & Rate (Number & Algebra ➡ Real Numbers)

- ★ Use percentages to solve problems, including those involving mark-ups, discounts, profit and loss and GST.
- ★ Express profit and loss as a percentage of cost or selling price, compare the difference.
- ★ Investigate the methods used in retail stores to express discounts.
- ★ Solve a range of problems involving rates and ratios, with and without digital technologies
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- ★ Calculate population rates in Australia and Asia and explain their difference.

Lesson	Method	Resources
1	☐ General (covering book, ruling pages, paste study guide etc.) ☐ Purpose of chapter ☐ Exercise 11.1 p146 ☐ Exercise 11.2 p147 (Model solutions) ☐ HW: Read and practice the Sweet Trick on p157	Rulers
2	☐ Short mental test on fraction/decimal/percentage equivalents ☐ Exercises 11.3 p147 (Model solutions) ☐ Exercises 11.4 p148 (Model solutions) ☐ Some students demonstrate the Sweet Trick p157 ☐ HW: Complete Exercises and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Short mental test on fraction/decimal/percentage equivalents ☐ Exercises 11.5 p149 (Model solutions) ☐ Exercises 11.6 p150 (Model solutions) ☐ HW: Complete Exercise	
4	☐ Short mental test on fraction/decimal/percentage equivalents ☐ Exercise 11.7 p151 (Model solutions) ☐ Exercise 11.8 p152 (Model solutions) ☐ HW: Complete exercises	
5	☐ Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique ☐ Mental computation Exercise 11.9 p153 ☐ NAPLAN Questions 7-18 p82 (Model solutions) ☐ HW: NAPLAN questions	
6	☐ Mental computation Exercise 11.10 p153 Group work working on a directed/choice/combination of: ☐ Investigation 11.1, 11.2, 11.3, 11.4 p156 ☐ A game p157 - (play the game a couple of times, determine a strategy) ☐ Technology 11.1, 11.2 p158 ☐ HW: A couple of puzzles 1-3 p157	Calculators Internet Computers
7	☐ Mental computation Exercise 11.11 p153 Group work working on a directed/choice/combination of: ☐ Investigation 11.1, 11.2, 11.3, 11.4 p156 ☐ A game p157 - (play the game a couple of times, determine a strategy) ☐ Technology 11.1, 11.2 p158 ☐ HW: A couple of puzzles 4-7 p157	Calculators Internet Computers
8	☐ NAPLAN Questions p154 (Model solutions) ☐ Competition Questions p155 (Model solutions) ☐ HW: Complete Questions	
9	☐ Chapter Review 1 p159 ☐ HW: Complete Chapter Review A couple of puzzles p85	
10	☐ Chapter Review 2 p160 ☐ HW: Complete Chapter Review A couple of puzzles p85	

Chapter 12 Linear Equations (Number & Algebra ➡ Linear & Non-linear Relationships)

★ Solve linear equations using algebraic and graphical techniques.
★ Use variables to symbolise simple linear equations and use a variety of strategies to solve them.
★ Solve equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation.

Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 12.1, p162 ☐ Exercise 12.2 p163 ☐ Exercise 12.3 p163 ☐ HW: Read and practice the Sweet Trick on p173	rulers graph paper?
2	☐ Short mental test on writing functions for patterns ☐ Exercise 12.4 p164 (Model solutions) ☐ Some students demonstrate the Sweet Trick p173 ☐ HW: Complete Ex 12.4 and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Exercise 12.5 p165 (Model solutions) ☐ HW: Complete exercise	
4	☐ Exercise 12.6 p166 (Model solutions) ☐ HW: Complete exercise	rulers graph paper?
5	☐ Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique ☐ Mental computation Exercise 12.9 p169 ☐ Exercise 12.7 p167 (Model solutions) ☐ HW: Complete exercise	
6	☐ Mental computation Exercise 12.10 p169 ☐ Exercise 12.8 p168 (Model solutions) ☐ HW: Complete exercise	
7	☐ Mental computation Exercise 12.11 p169 Group work working on a directed/choice/combination of: ☐ Investigation 12.1, 12.2, 12.3 p174 ☐ A game p173 ☐ Technology 12.1, 12.2 p172 ☐ HW: A couple of puzzles 1-5 p173	Internet computers graphics calculators stop watch
8	☐ NAPLAN Questions p170 (Model solutions) ☐ Competition Questions p171 (Model solutions) ☐ HW: Complete Competition Questions	
9	☐ Chapter Review 1 p175 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p176 ☐ HW: Complete Chapter Review	

Chapter 13 Data   (Statistics & Probability ➡ Data Representation)

★ Explore the practicalities and implications of obtaining representative data.
★ Understand that making decisions and drawing conclusions based on data may differ from those based on preferences and beliefs.
★ Explore the variation of means and proportions in representative data.
★ Investigate an international issue where media reporting and the use of data reflects different cultural or social emphases.
★ Use sample properties to predict characteristics of the population.

Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 13.1 p178 ☐ HW: Read and practice the Sweet Trick on p188	
2	☐ Exercise 13.2 p179 ☐ Exercise 13.3 p180 ☐ Some students demonstrate the Sweet Trick p188 ☐ HW: Complete Exercise and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Technology 13.1 p187 ☐ Exercise 13.4 p181 ☐ HW: A couple of puzzles p188	calculators
4	☐ Exercise 13.5 p182 (Model solutions) ☐ Short class test on mode, median, mean - repeat as necessary ☐ HW: Complete exercise	
5	☐ Mental computation Exercise 13.6 p183 ☐ NAPLAN Questions p184 (Model solutions) ☐ HW: Complete exercise	
6	☐ Mental computation Exercise 13.7 p183 Group work working on a directed/choice/combination of: ☐ Investigation 13.1, 13.2, 13.3, 13.4 p186 ☐ A game p188	centicubes Internet
7	☐ Mental computation Exercise 13.8 p183 Group work working on a directed/choice/combination of: ☐ Investigation 13.1, 13.2, 13.3, 13.4 p186 ☐ A game p188	
8	☐ Competition Questions p185 (Model solutions) ☐ HW: Complete Competition Questions	centicubes Internet
9	☐ Chapter Review 1 p189 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p190 ☐ HW: Complete Chapter Review	

Chapter 14 Time   (Measurement & Geometry ➡ Units of Measurement)

- ★ Solve problems involving duration, including using 12-hour and 24-hour time within a single time zone.
- ★ Calculate travel times given the start and finish time in 12-hour and 24-hour time including where the start and end time are in different time zones.
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Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 14.1 p192 ☐ HW: Read and practice the Sweet Trick on p202	
2	☐ Some mental practice of the Sweet Trick ☐ Exercise 14.2 p193 ☐ Some students demonstrate the Sweet Trick p202 ☐ HW: Complete Exercise and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Exercise 14.3 p194 (Model solutions) ☐ HW: Complete exercise, A couple of puzzles 1-2 p202	
4	☐ Exercise 14.4 p195 (Model solutions) ☐ Exercise 14.5 p196 (Model solutions) ☐ HW: Complete exercise, HW: A couple of puzzles 3 p202	
5	☐ Mental computation Exercise 14.6 p197 ☐ NAPLAN Questions p198 (Model solutions) ☐ HW: Complete exercise	
6	☐ Mental computation Exercise 14.7 p197 Group work working on a directed/choice/combination of: ☐ Investigation 14.1, 14.2, 13.3 p201 ☐ A game p202 ☐ Technology 14.1, 14.2, 14.3, 14.4 p200 ☐ HW: A couple of puzzles p202	Internet spreadsheet
7	☐ Mental computation Exercise 14.8 p197 Group work working on a directed/choice/combination of: ☐ Investigation 14.1, 14.2, 13.3 p201 ☐ A game p202 ☐ Technology 14.1, 14.2, 14.3, 14.4 p200	Internets spreadsheet
8	☐ 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 145, page 161, page 177, page 191)

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

Chapter 11   Ratio & Rate   (Number & Algebra ➡ Real Numbers)
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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