Lesson Plans

Year 8 Mathematics   TERM 1

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 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 1	Index Laws	Number & Algebra - Number and place value	2 weeks
Chapter 2	Integers	Number and Algebra - Integers	2 weeks
Chapter 3	Algebra	Number and Algebra - Patterns and Algebra	2 weeks
Chapter 4	Probability	Statistics and Probability - Chance	2 weeks
Chapter 5	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 1   Index Laws   (Number and Algebra ➡ Number and place value)
- ★ Use index notation with numbers to establish the index laws with positive integral indices and the zero index.
- ★ Evaluate numbers expressed as powers of positive integers.

Chapter 2   Integers   (Number and Algebra ➡ Integers)
- ★ Carry out the four operations with integers.
- ★ Use efficient mental and written strategies.
- ★ Use appropriate digital technologies.

Chapter 3   Algebra   (Number and Algebra ➡ Patterns and Algebra)
- ★ Extend and apply the distributive law to the expansion of algebraic expressions.
- ★ Factorise algebraic expressions by identifying (highest common factor) of numeric and algebraic expressions.
- ★ Simplify algebraic expressions involving the four operations.

Chapter 4   Probability   (Statistics and Probability ➡ Chance)
- ★ Understand that probabilities range between 0 to 1.
- ★ Identify complementary events.
- ★ Identify the complement of familiar events.
- ★ Use the sum of probabilities to solve problems.

Chapter 5   Review
- ★ Review of all of above.

Chapter 1   Index Laws   (Number and Algebra ➥ Number and place value)

★ Use index notation with numbers to establish the index laws with positive integral indices and the zero index.

★ Evaluate numbers expressed as powers of positive integers.

Lesson	Method	Resources
1	☐ General (covering book, ruling pages, paste study guide etc.) ☐ Purpose of chapter ☐ Discussion about need to be more efficient with numbers ☐ Exercise 1.1 p2 (Model solutions for students as students progress through exercise) ☐ HW: Read and practice the Sweet Trick on p13	Rulers
2	☐ Exercises 1.2, 1.3, 1.4 p3 ☐ Index Law 1 (Demonstrate the law) ☐ Exercise 1.5 (Model solutions) ☐ Some students demonstrate the Sweet Trick p13 ☐ HW: Complete Ex 1.5 and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Index Law 2 (Demonstrate the law) ☐ Exercise 1.6 (Model solutions) ☐ Summary of work to date Exercises 1.7, 1.8. 1.9, 1.10 p6 ☐ HW: Complete Exercises p6	
4	☐ Index Law 3 (Demonstrate the law) ☐ Exercise 1.11 p7 (Model solutions) ☐ Investigation 1.1 p12 (Students may need introduction and further support) ☐ HW: Complete exercise and Investigations 1.1, 1.2	
5	☐ Mental computation Exercise 1.13 p9 ☐ Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique ☐ Zero Index (Demonstrate the law) ☐ Exercise 1.12 (Model solutions) ☐ NAPLAN preparation p10 (Model solutions) ☐ HW: Complete Exercises p8 and 10	Calculators
6	☐ Mental computation Exercise 1.14 p9 Group work working on a choice/combination of: ☐ A couple of puzzles p13 ☐ Investigation 1.3 p12 ☐ A game p13 - (play the game a couple of times, try to determine a strategy) ☐ HW: Competition Questions 1-3 p11	
7	☐ Mental computation Exercise 1.15 p9 Group work working on a choice/combination of: ☐ A couple of puzzles p13 ☐ Investigation 1.3 p12 ☐ A game p13 - (play the game a couple of times, try to determine a strategy) ☐ HW: Competition Questions 4-6 p11	
8	☐ Technology 1.1 and 1.2 p14 ☐ Competition Questions 4-10 p11 (Model solutions) ☐ HW: Complete Competition Questions p11	Computers spreadsheet
9	☐ Chapter Review 1 p15 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p16 ☐ HW: Complete Chapter Review	

Chapter 2 Integers   (Number and Algebra ➡ Integers)

★ Carry out the four operations with integers.
★ Use efficient mental and written strategies.
★ Use appropriate digital technologies.

Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 2.1 p18 (Model solutions for students) ☐ HW: Read and practice the Sweet Trick on p29	
2	☐ x5 practice eg 46×5 = 46×10÷2 = 460÷2 = 230 ☐ Some students demonstrate the Sweet Trick p29 ☐ Exercises 2.2, 2.3 p19 ☐ Exercise 2.4 and 2.5 p20 (Model adding of integers) ☐ HW: Complete Ex 2.4, 2.5 and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Exercise 2.6 p21 (Model solutions) ☐ Exercise 2.7 p22 ☐ HW: Complete Exercises 2.6 and 2.7	
4	☐ Exercise 2.8 p23 (Model solutions) ☐ Repeat Exercise 2.8 Q25-34 until almost all students proficient. ☐ HW: A couple of puzzles Exercise 2.15 p29	
5	☐ Mental computation Exercise 2.10 p25 ☐ Revisit discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique ☐ Review of Integer operations Exercise 2.9 p24 (Model solutions) ☐ Revise Integer operations until almost all students proficient. ☐ HW: Competition Questions 1-2 p27	
6	☐ Mental computation Exercise 2.11 p25 ☐ NAPLAN Questions Exercise 2.13 p26 ☐ HW: Complete NAPLAN Questions	
7	☐ Mental computation Exercise 2.12 p25 Group work working on a choice/combination of: ☐ Investigations 2.1, 2.2 p28 ☐ A Game p29 ☐ Technology 2.1, 2.2, 2.3 p30 ☐ HW: Competition Questions 3-4 p27	Calculators Computers
8	Group work working on a choice/combination of: ☐ Investigations 2.1, 2.2 p28 ☐ A game p29 ☐ Technology 2.1, 2.2, 2.3 p30 ☐ HW: Competition Questions 3-4 p27	Calculators Computers
9	☐ Chapter Review 1 p31 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p32 ☐ HW: Complete Chapter Review	

Chapter 3   Algebra   (Number and Algebra ➡ Patterns and Algebra)

- ★ Extend and apply the distributive law to the expansion of algebraic expressions.
- ★ Factorise algebraic expressions by identifying (highest common factor) of numeric and algebraic expressions.
- ★ Simplify algebraic expressions involving the four operations.

Lesson	Method	Resources
1	☐ Purpose of chapter. Importance of algebra for solving millions of problems ☐ Exercise 3.1 p34 (Model solutions for students) ☐ Exercise 3.2 p35 (Model solutions for students) ☐ HW: Read and practice the Sweet Trick on p48 and complete exercises	
2	☐ Exercises 3.3, 3.4 p36 ☐ Some students demonstrate the Sweet Trick p48 ☐ HW: Complete Ex 3.3, 3.4 and demonstrate Sweet Trick at home/lodgings	
3	☐ Discussion about Sweet Trick - how to improve presentation ☐ Exercise 3.5 p37 and 3.6 p38 (Model solutions) ☐ HW: Complete Exercise 3.5 and 3.6	
4	☐ Exercise 3.7 and 3.8 p38 (Model solutions) ☐ Exercise 3.9 p39 (Model solutions) ☐ HW: Complete Exercise 3.7, 3.8, 3.9	
5	☐ Mental computation Exercise 3.17 p43 ☐ Revisit discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique ☐ Exercise 3.10 p40 (Model solutions) ☐ Exercise 3.11, 3.12, 1.13 p41 (Model solutions) ☐ HW: Complete Exercise 3.11, 3.12, 3.13	
6	☐ Mental computation Exercise 3.18 p43 ☐ Exercise 3.14, 3.15, 3.16 p42 (Model solutions) ☐ NAPLAN Questions Exercise 3.20 p44 ☐ HW: Complete NAPLAN Questions ??	
7	☐ Mental computation Exercise 3.19 p43 Group work working on a directed/choice/combination of: ☐ Investigations 3.1, 3.2, 3.3 p46 ☐ A Game p48 ☐ Technology 3.1, 3.2, 3.3 p47 ☐ HW: Competition Questions 1 p45	Centicubes Computers Calculators
8	Group work working on a choice/combination of: ☐ Investigations 3.1, 3.2, 3.3 p46 ☐ A Game p48 ☐ Technology 3.1, 3.2, 3.3 p47 ☐ HW: Competition Questions 2-7 p45	Centicubes Computers Calculators
9	☐ Chapter Review 1 p49 ☐ HW: Complete Chapter Review and a couple of puzzles p48	
10	☐ Chapter Review 2 p50 ☐ HW: Complete Chapter Review	

Chapter 4   Probability   (Statistics and Probability ➡ Chance)

★ Understand that probabilities range between 0 to 1.
★ Identify complementary events.
★ Identify the complement of familiar events.
★ Use the sum of probabilities to solve problems.

Lesson	Method	Resources
1	☐ Purpose of chapter ☐ Exercise 4.1 p52 1-3 (Model solutions for students) ☐ HW: Read and play the Game on p62 without money being involved	Coins
2	☐ Discussion of the Game p62 to ensure correct rules. Is the game fair? ☐ Exercise 4.1 p52 4, 5, 6 ☐ Investigation 4.2 p60 (Students make the spinners?) ☐ HW: A couple of puzzles Exercise 4.9 1,2 p62 and Play the Game on p62 at home/lodgings without money being involved	Dice Spinners
3	☐ Discussion about Two-up. Is it fair when played in Casinos? ☐ Exercise 4.2 p54 (Model solutions) ☐ Investigation 4.3 p60 ☐ HW: NAPLAN Questions 1-5 p58	Dice
4	☐ Exercise 4.3 1-5 p55 (Model solutions) ☐ NAPLAN Questions 6-11 p58 (Model solutions) ☐ HW: Complete above exercises	
5	☐ Mental computation Exercise 4.4 p57 ☐ Exercise 4.3 6-9 p56 (Model solutions) ☐ Repeat Exercise 4.1 3 using Technology 4.1 or 4.2 p61. ☐ HW: A couple of puzzles Exercise 4.9 3,4,5 p62	Calculator Computers
6	☐ Mental computation Exercise 4.5 p57 ☐ Repeat Exercise 4.1 5 using Technology 4.3 p61. ☐ Competition Questions 1 and 2 p59 (Model solutions) ☐ HW: A little bit of history - why double six in 24 throws is poor value p51	Computers
7	☐ Mental computation Exercise 4.6 p57 Group work working on a choice/combination of: ☐ Investigations 4.1, 4.4, 4.5 p60 ☐ HW: Competition Questions 3-4 p59	Computers Internet
8	Group work working on a choice/combination of: ☐ Investigations 4.1, 4.4, 4.5 p60 ☐ HW: Competition Questions 5-6 p59	Computers Internet
9	☐ Chapter Review 1 p63 ☐ HW: Complete Chapter Review	
10	☐ Chapter Review 2 p64 ☐ HW: Complete Chapter Review	

A Task

Work on one of the four tasks at the beginning of each chapter.
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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 5   Review

Chapter 1   Index Laws   (Number and Algebra ➡ Number and place value)

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★ Evaluate numbers expressed as powers of positive integers.

Chapter 2   Integers   (Number and Algebra ➡ Integers)

★ Carry out the four operations with integers.
★ Use efficient mental and written strategies.
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Chapter 4   Probability   (Statistics and Probability ➡ Chance)

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★ Identify the complement of familiar events.
★ Use the sum of probabilities to solve problems.

Lesson	Method	Resources
1-10	☐ Purpose of Review ☐ Review 1 p66 ☐ Review 2 p69 ☐ Repetition of above until mastery? ☐ Sample end of term papers (www.drdwyer.com.au) ☐ Assessment	Textbook Assesssment instruments