



# Lesson Plans

## Year 8 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 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 2 Lessons (10 weeks)

Chapter 6	Real Numbers	Number & Algebra - Real Numbers	2 weeks
Chapter 7	Congruence	Measurement & Geometry - Congruence	2 weeks
Chapter 8	Data	Statistics & Probability - Data Representation	2 weeks
Chapter 9	Circles	Measurement & Geometry - Units of Measurement	2 weeks
Chapter 10	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 6 Real Numbers (Number & Algebra → Real Numbers)

- ★ Recognise terminating, recurring and non-terminating decimals and choose their appropriate representations.
- ★ Investigate the concept of irrational numbers, including  $\pi$ .
- ★ Understand that the real number system includes irrational numbers and that certain subsets of the real number system have particular properties.

### Chapter 7 Congruence (Measurement & Geometry → Congruence)

- ★ Two figures are congruent if one shape lies exactly on top of the other after one or more transformations (translation, reflection, rotation).
- ★ Solve problems using properties of congruent figures, justifying reasoning and making generalisations.
- ★ The minimal conditions for congruence (SSS, SAS, ASA and RHS) and the conditions that do not prescribe congruence (ASS, AAA).
- ★ Plot the vertices of two-dimensional shapes on the Cartesian plane, translating, rotating or reflecting the shape and using coordinates to describe the transformation.

### Chapter 8 Data (Statistics & Probability → Data Representation)

- ★ Use sample properties to predict characteristics of the population.
- ★ Use displays of data to explore and investigate effects.
- ★ 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.
- ★ Investigate the effect of individual data values, including outliers, on the mean and median.

### Chapter 9 Circles (Measurement & Geometry → Units of Measurement)

- ★ Investigate the relationship between features of circles such as circumference, area, radius and diameter.
- ★ Use formulas to solve problems involving circumference and area.
- ★ Investigate the circumference and area of circles with materials or by measuring, to establish an understanding of formulas.
- ★ Investigate the area of circles using a square grid or by rearranging a circle divided into sectors.

### Chapter 10 Review

- ★ Review all of above

## Chapter 6 Real Numbers (Number & Algebra → Real Numbers)

- ★ Recognise terminating, recurring and non-terminating decimals and choose their appropriate representations.
- ★ Investigate the concept of irrational numbers, including  $\pi$ .
- ★ Understand that the real number system includes irrational numbers and that certain subsets of the real number system have particular properties.

Lesson	Method	Resources
1	<ul style="list-style-type: none"> <li><input type="checkbox"/> General (covering book, ruling pages, paste study guide etc.)</li> <li><input type="checkbox"/> Purpose of chapter</li> <li><input type="checkbox"/> Copy Real Numbers schematic from p74 into workpads</li> <li><input type="checkbox"/> Exercise 6.1, 6.2 p75</li> <li><input type="checkbox"/> Exercise 6.3 p76</li> <li><input type="checkbox"/> HW: Read and practice the Sweet Trick on p85</li> </ul>	Rulers
2	<ul style="list-style-type: none"> <li><input type="checkbox"/> Practice mental summing digits to single number: <math>183 = 1+8+3=12=1+2=3</math></li> <li><input type="checkbox"/> Exercises 6.4 p77</li> <li><input type="checkbox"/> Exercises 6.5 1 and 2 p78</li> <li><input type="checkbox"/> Some students demonstrate the Sweet Trick p85</li> <li><input type="checkbox"/> HW: Complete Ex 6.5 and demonstrate Sweet Trick at home/lodgings</li> </ul>	
3	<ul style="list-style-type: none"> <li><input type="checkbox"/> Discussion about Sweet Trick - how to improve presentation</li> <li><input type="checkbox"/> Short class test of rounding - repeat as necessary</li> <li><input type="checkbox"/> Exercise 6.5 3-4 p79 (Model solutions)</li> <li><input type="checkbox"/> HW: Complete Exercises p79 and learn fractions/decimals by heart</li> </ul>	
4	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short class test of fractions/decimals. Repeat as necessary</li> <li><input type="checkbox"/> Exercise 6.6 p80 (Model solutions)</li> <li><input type="checkbox"/> NAPLAN Questions 1-6 p82 (Model solutions)</li> <li><input type="checkbox"/> HW: Complete exercises</li> </ul>	
5	<ul style="list-style-type: none"> <li><input type="checkbox"/> Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique</li> <li><input type="checkbox"/> Mental computation Exercise 6.7 p81</li> <li><input type="checkbox"/> NAPLAN Questions 7-18 p82 (Model solutions)</li> <li><input type="checkbox"/> HW: NAPLAN questions</li> </ul>	Calculators
6	<ul style="list-style-type: none"> <li><input type="checkbox"/> Mental computation Exercise 6.8 p81</li> </ul> <p>Group work working on a directed/choice/combination of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Investigation 6.3, 6.2, 6.3 p84</li> <li><input type="checkbox"/> A game p85 - (play the game a couple of times, try to determine a strategy)</li> <li><input type="checkbox"/> Technology 6.1, 6.2, 6.3 p86</li> <li><input type="checkbox"/> HW: Play game at home using a strategy to win most games</li> </ul>	Calculators Internet
7	<ul style="list-style-type: none"> <li><input type="checkbox"/> Mental computation Exercise 6.8 p81</li> </ul> <p>Group work working on a directed/choice/combination of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Investigation 6.3, 6.2, 6.3 p84</li> <li><input type="checkbox"/> A game p85 - (play the game a couple of times, try to determine a strategy)</li> <li><input type="checkbox"/> Technology 6.1, 6.2, 6.3 p86</li> <li><input type="checkbox"/> HW: Play game at home using a strategy to win most games</li> </ul>	Calculators Internet
8	<ul style="list-style-type: none"> <li><input type="checkbox"/> Competition Questions 1-13 p83 (Model solutions)</li> <li><input type="checkbox"/> HW: Complete Competition Questions</li> </ul>	
9	<ul style="list-style-type: none"> <li><input type="checkbox"/> Chapter Review 1 p87</li> <li><input type="checkbox"/> HW: Complete Chapter Review     A couple of puzzles p85</li> </ul>	
10	<ul style="list-style-type: none"> <li><input type="checkbox"/> Chapter Review 2 p87</li> <li><input type="checkbox"/> HW: Complete Chapter Review     A couple of puzzles p85</li> </ul>	

## Chapter 7 Congruence (Measurement & Geometry → Congruence)

- ★ Two figures are congruent if one shape lies exactly on top of the other after one or more transformations (translation, reflection, rotation).
- ★ Solve problems using properties of congruent figures, justifying reasoning and making generalisations.
- ★ The minimal conditions for congruence (SSS, SAS, ASA and RHS) and the conditions that do not prescribe congruence (ASS, AAA).
- ★ Plot the vertices of two-dimensional shapes on the Cartesian plane, translating, rotating or reflecting the shape and using coordinates to describe the transformation.

Lesson	Method	Resources
1	<input type="checkbox"/> Purpose of chapter <input type="checkbox"/> Exercise 7.1, p91 <input type="checkbox"/> Exercise 7.2 p91 <input type="checkbox"/> Begin Investigation 7.1 p101 by making the tessellation shown <input type="checkbox"/> HW: Read and practice the Sweet Trick on p102	
2	<input type="checkbox"/> Exercises 7.3 p92 <input type="checkbox"/> SSS activity p93 <input type="checkbox"/> AAA activity p93 <input type="checkbox"/> Some students demonstrate the Sweet Trick p102 <input type="checkbox"/> HW: Complete Ex 6.5 and demonstrate Sweet Trick at home/lodgings	rulers scissors protractors
3	<input type="checkbox"/> Discussion about Sweet Trick - how to improve presentation <input type="checkbox"/> SAS activity p93 <input type="checkbox"/> ASA activity p93 <input type="checkbox"/> RHS activity p93 <input type="checkbox"/> HW: A couple of puzzles 1-3 p102	
4	<input type="checkbox"/> Exercise 7.4 p95 (Model solutions) <input type="checkbox"/> HW: Complete exercise 7.4	
5	<input type="checkbox"/> Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique <input type="checkbox"/> Mental computation Exercise 7.6 p97 <input type="checkbox"/> Exercise 7.5 p96 (Model solutions) <input type="checkbox"/> Investigation 7.1 p101 making own tessellation <input type="checkbox"/> HW: Own tessellation	
6	<input type="checkbox"/> Mental computation Exercise 7.7 p97 Group work working on a directed/choice/combination of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Investigation 7.1, 7.2.3 p101</li> <li><input type="checkbox"/> A game p102</li> <li><input type="checkbox"/> Technology 7.1, 7.2, 7.3 p100</li> <li><input type="checkbox"/> HW: Play game at home using a strategy to win most games</li> </ul>	
7	<input type="checkbox"/> Mental computation Exercise 7.8 p97 Group work working on a directed/choice/combination of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Investigation 7.1, 7.2.3 p101</li> <li><input type="checkbox"/> A game p102</li> <li><input type="checkbox"/> Technology 7.1, 7.2, 7.3 p100</li> <li><input type="checkbox"/> HW: A couple of puzzles 4-5 p102</li> </ul>	
8	<input type="checkbox"/> NAPLAN Questions p98 (Model solutions) <input type="checkbox"/> Competition Questions p99 (Model solutions) <input type="checkbox"/> HW: Complete Competition Questions	
9	<input type="checkbox"/> Chapter Review 1 p103 <input type="checkbox"/> HW: Complete Chapter Review	
10	<input type="checkbox"/> Chapter Review 2 p104 <input type="checkbox"/> HW: Complete Chapter Review	

## Chapter 8 Data (Statistics & Probability → Data Representation)

- ★ Use sample properties to predict characteristics of the population.
- ★ Use displays of data to explore and investigate effects.
- ★ 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.
- ★ Investigate the effect of individual data values, including outliers, on the mean and median.

Lesson	Method	Resources
1	<input type="checkbox"/> Purpose of chapter <input type="checkbox"/> Discussion about need for Census and how to get reliable data <input type="checkbox"/> Exercise 8.1 p106 <input type="checkbox"/> Exercise 8.2 p107 <input type="checkbox"/> HW: Read and practice the Sweet Trick on p118	
2	<input type="checkbox"/> Exercises 8.3 p108 <input type="checkbox"/> Some students demonstrate the Sweet Trick p118 <input type="checkbox"/> HW: Complete Ex 8.3 and demonstrate Sweet Trick at home/lodgings	
3	<input type="checkbox"/> Discussion about Sweet Trick - how to improve presentation <input type="checkbox"/> Exercise 8.4 and 8.5 p109 (Model solutions) <input type="checkbox"/> HW: Complete Exercises p109	
4	<input type="checkbox"/> Exercise 8.6 and 8.7 p110 (Model solutions) <input type="checkbox"/> Short class test on range, mode, median, mean - repeat as necessary <input type="checkbox"/> HW: Complete exercises	
5	<input type="checkbox"/> Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique <input type="checkbox"/> Mental computation Exercise 8.9 p113 <input type="checkbox"/> Exercise 8.8 p112 (Model solutions) <input type="checkbox"/> HW: Complete exercises	
6	<input type="checkbox"/> Mental computation Exercise 8.10 p113 Group work working on a directed/choice/combination of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Investigation 8.1, 8.2, 8.3 p116</li> <li><input type="checkbox"/> A game p118</li> <li><input type="checkbox"/> Technology 8.1, 8.2, 8.3 p117</li> <li><input type="checkbox"/> HW: A couple of puzzles 1-3 p118</li> </ul>	Calculators Computer Graphics Calc? Internet
7	<input type="checkbox"/> Mental computation Exercise 8.11 p113 Group work working on a directed/choice/combination of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Investigation 8.1, 8.2, 8.3 p116</li> <li><input type="checkbox"/> A game p118</li> <li><input type="checkbox"/> Technology 8.1, 8.2, 8.3 p117</li> <li><input type="checkbox"/> HW: A couple of puzzles 4-6 p118</li> </ul>	Calculators Computer Graphics Calc? Internet
8	<input type="checkbox"/> NAPLAN Questions p114 (Model solutions) <input type="checkbox"/> Competition Questions p115 (Model solutions) <input type="checkbox"/> HW: Complete Competition Questions	
9	<input type="checkbox"/> Chapter Review 1 p119 <input type="checkbox"/> HW: Complete Chapter Review	
10	<input type="checkbox"/> Chapter Review 2 p120 <input type="checkbox"/> HW: Complete Chapter Review	

## Chapter 9 Circles (Measurement & Geometry → Units of Measurement)

- ★ Investigate the relationship between features of circles such as circumference, area, radius and diameter.
- ★ Use formulas to solve problems involving circumference and area.
- ★ Investigate the circumference and area of circles with materials or by measuring, to establish an understanding of formulas.
- ★ Investigate the area of circles using a square grid or by rearranging a circle divided into sectors.

Lesson	Method	Resources
1	<input type="checkbox"/> Purpose of chapter <input type="checkbox"/> Exercise 9.1, p122 <input type="checkbox"/> HW: Read and practice the Sweet Trick on p134	set squares? round objects rulers
2	<input type="checkbox"/> Exercise 9.2 p123 <input type="checkbox"/> Some students demonstrate the Sweet Trick p134 <input type="checkbox"/> HW: Demonstrate Sweet Trick at home/lodgings	measuring calculators chalk
3	<input type="checkbox"/> Discussion about Sweet Trick - how to improve presentation <input type="checkbox"/> Exercise 9.3 p124(Model solutions) <input type="checkbox"/> HW: Complete exercise	calculators
4	<input type="checkbox"/> Exercise 9.4 p124 (Model solutions) <input type="checkbox"/> HW: Complete exercise	calculators
5	<input type="checkbox"/> Discussion of why employers are adamant that employees have adequate mental computation skills - also very useful revision technique <input type="checkbox"/> Mental computation Exercise 9.9 p129 <input type="checkbox"/> Exercise 9.5 p126 <input type="checkbox"/> Exercise 9.6 p126 <input type="checkbox"/> HW: A couple of puzzles p134	round objects compass ruler calculators
6	<input type="checkbox"/> Mental computation Exercise 9.10 p129 Group work working on a directed/choice/combination of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Exercise 9.7 p127</li> <li><input type="checkbox"/> HW: NAPLAN 1-5 p130</li> </ul>	calculators
7	<input type="checkbox"/> Exercise 9.8 p128 <input type="checkbox"/> NAPLAN Questions 6-9 p130 (Model solutions) <input type="checkbox"/> HW: Complete exercises	calculators
8	<input type="checkbox"/> Mental computation Exercise 9.11 p129 Group work working on a directed/choice/combination of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Competition Questions p131</li> <li><input type="checkbox"/> Investigation 9.1, 9.2, 9.3 p132</li> <li><input type="checkbox"/> A game p134</li> <li><input type="checkbox"/> Technology 9.1, 9.2, 9.3, 9.4 p133</li> </ul>	calculators computers Internet
9	<input type="checkbox"/> Chapter Review 1 p135 <input type="checkbox"/> HW: Complete Chapter Review	
10	<input type="checkbox"/> Chapter Review 2 p136 <input type="checkbox"/> HW: Complete Chapter Review	

## A Task

Work on one of the four tasks at the beginning of each chapter.  
(Page 73, page 89, page 105, page 121)

Lesson	Method	Resources
1-5	<ul style="list-style-type: none"> <li><input type="checkbox"/> Setup</li> <li><input type="checkbox"/> Decide whether tasks completed individually, groups of two, three, or four</li> <li><input type="checkbox"/> Decide which tasks are assigned to individuals/groups</li> <li><input type="checkbox"/> Decide how tasks are to be presented: Oral presentation, poster presentation (on classroom wall), power point presentation etc.</li> <li><input type="checkbox"/> If the presentation will take class time then decide when.</li> <li><input type="checkbox"/> Each lesson may be started with a mental computation or a summary of what is expected from the work on the tasks.</li> </ul>	Textbook Assessment instruments

## Chapter 10 Review

### Chapter 6 Real Numbers (Number & Algebra → Real Numbers)

- ★ Recognise terminating, recurring and non-terminating decimals and choose their appropriate representations.
- ★ Investigate the concept of irrational numbers, including  $\pi$ .
- ★ Understand that the real number system includes irrational numbers and that certain subsets of the real number system have particular properties.

### Chapter 7 Congruence (Measurement & Geometry → Congruence)

- ★ Two figures are congruent if one shape lies exactly on top of the other after one or more transformations (translation, reflection, rotation).
- ★ Solve problems using properties of congruent figures, justifying reasoning and making generalisations.
- ★ The minimal conditions for congruence (SSS, SAS, ASA and RHS) and the conditions that do not prescribe congruence (ASS, AAA).
- ★ Plot the vertices of two-dimensional shapes on the Cartesian plane, translating, rotating or reflecting the shape and using coordinates to describe the transformation.

### Chapter 8 Data (Statistics & Probability → Data Representation)

- ★ Use sample properties to predict characteristics of the population.
- ★ Use displays of data to explore and investigate effects.
- ★ 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.
- ★ Investigate the effect of individual data values, including outliers, on the mean and median.

### Chapter 9 Circles (Measurement & Geometry → Units of Measurement)

- ★ Investigate the relationship between features of circles such as circumference, area, radius and diameter.
- ★ Use formulas to solve problems involving circumference and area.
- ★ Investigate the circumference and area of circles with materials or by measuring, to establish an understanding of formulas.
- ★ Investigate the area of circles using a square grid or by rearranging a circle divided into sectors.

Lesson	Method	Resources
1-10	<ul style="list-style-type: none"> <li><input type="checkbox"/> Purpose of Review</li> <li><input type="checkbox"/> Review 1 p138</li> <li><input type="checkbox"/> Review 2 p141</li> <li><input type="checkbox"/> Repetition of above until mastery?</li> <li><input type="checkbox"/> Sample end of term papers (<a href="http://www.drdwyer.com.au">www.drdwyer.com.au</a>)</li> <li><input type="checkbox"/> Assessment</li> </ul>	Textbook Assessment instruments