

6 January 2016

## TEACHER NOTES FOR YEAR 11 ESSENTIAL MATHEMATICS

### CHAPTER 1: WHOLE NUMBERS

	SACE	ACARA
A Operations with whole numbers	Topic 1 Sub-topic 1.1	Unit 1 Topic 1
B Multi-step calculations		
C Indices		
D Square numbers and square roots		
E Order of operations		
F Rounding and approximation		
G Factors and multiples		

This opening chapter gives students an opportunity to revise operations involving whole numbers.

The focus in this chapter is on performing the operations by hand, and strategies are provided to help students with this. In this chapter, calculators should only be used when directly instructed in the question, such as in the calculation of powers and square roots of larger numbers.

Factors and multiples are not explicitly required in the syllabus, however we have included them because they are useful in the study of fractions in the following chapter.

### CHAPTER 2: FRACTIONS, DECIMALS, AND PERCENTAGES

	SACE	ACARA
A Fractions	Topic 1 Sub-topic 1.1	Unit 1 Topic 1
B Decimals		
C Rounding decimal numbers		
D Scientific notation		
E Percentages		
F Percentage increase and decrease		

In this chapter students perform operations involving fractions, decimals, and percentages. As with Chapter 1, the emphasis is on performing these operations by hand. However, once the procedures have been learnt, students should feel free to use technology where it is appropriate to do so. This is especially the case in the problem solving sections, where large numbers are often involved.

Scientific notation is in the SACE syllabus but not the ACARA syllabus, so only South Australian students need to complete Section D.

### CHAPTER 3: TIME

	SACE	ACARA
A Units of time	Topic 1 Sub-topic 1.2	Unit 2 Topic 4
B Time calculations		
C 24 hour time		
D Timetables		
E Time zones		

This chapter provides a fairly standard treatment of time. Students are given practical contexts to solve problems involving units of time, time interval calculations, and timetables.

We have included a section about time zones and daylight saving, as this is the type of practical application of time that students are likely to encounter in their daily lives.

### CHAPTER 4: UNITS

	SACE	ACARA
A Units of length	Topic 5 Sub-topic 5.1, 5.2, 5.3, 5.4	Unit 1 Topic 2
B Units of area		
C Units of volume		
D Units of capacity		
E Units of mass		

Converting between units features many times in the syllabus. Many of the conversions will be unfamiliar to students, especially conversions to imperial units such as inches, acres, pounds, and ounces.

We therefore feel that it is sensible to present these conversions in a chapter of their own. This means that, when students encounter the calculation of perimeter, area, volume, and capacity in Chapter 7, they will already be familiar with the units involved.

Sub-topic 5.5 (Power and energy) is covered in Chapter 10.

### CHAPTER 5: GEOMETRY

	SACE	ACARA
A 2-dimensional shapes	Topic 3 Sub-topic 3.1	
B 3-dimensional shapes		
C Angles	Topic 3 Sub-topic 3.2	
D Complementary and supplementary angles		
E Angle pairs		
F Parallel lines	Topic 3 Sub-topic 3.3	
G Geometric construction		

Geometry is in the SACE syllabus, but not the ACARA syllabus. Therefore, only South Australian students should study this chapter.

Much of the content in this chapter will be familiar to students. Classes should move quickly through the sections the students are comfortable with.

We have presented Sub-topic 3.2 (Angle geometry) before Sub-topic 3.1 (Shapes), because we cannot talk about regular polygons before discussing angle sizes.

## CHAPTER 6: EQUATIONS AND FORMULAE

	SACE	ACARA
A Algebraic substitution		
B Linear equations		Unit 1
C Problem solving with linear equations		Topic 3
D Formula substitution		
E Formula rearrangement		

The content in this chapter is not explicitly mentioned in the SACE syllabus. However, South Australian students are encouraged to study the chapter, as many of the concepts are useful in upcoming chapters, including Measurement (Chapter 7), Rates (Chapter 9), and Investing (Chapter 12).

## CHAPTER 7: MEASUREMENT

	SACE	ACARA
A Measuring length	Topic 5	
B Perimeter		Sub-topic 5.1
C Area	Topic 5	Unit 1
	Sub-topic 5.2	Topic 2
D Volume	Topic 5	
E Capacity	Sub-topic 5.4	

This chapter builds on the work done in Chapter 4 (Units). In this chapter, students use formulae to calculate perimeter, area, volume, and capacity.

Section A guides students through the concepts of estimating lengths and the accuracy of measuring devices. Students should be encouraged to complete the Activities and Discussions in this section to enhance their estimation skills.

Only South Australian students are required to perform calculations involving  $\pi$ , such as finding the circumference and area of circles, or the volume of cylinders.

## CHAPTER 8: RATIO AND SCALE

	SACE	ACARA
A Ratio	} Topic 1 Sub-topic 1.3	Unit 2 Topic 3
B Writing ratios as fractions		
C Equal ratios		
D Proportions		
E Using ratios to divide quantities		
F Scale diagrams		

This chapter provides a fairly standard treatment of ratios. Section F (Scale diagrams) is useful preparation for Topic 1 (Scales, Plans, and Models) in Stage 2.

## CHAPTER 9: RATES

	SACE	ACARA
A Rates	} Topic 1 Sub-topic 1.2	Unit 2 Topic 3
B Speed		
C Unit prices		
D Converting rates		

This chapter contains the remaining content in Sub-topic 1.2 (Time and rates).

This chapter was placed after Sub-topic 1.3 (Ratio and Scales) because we felt it was more sensible to covers ratios (comparisons of quantities of the *same* kind) before covering rates (comparisons of quantities of *different* kinds).

## CHAPTER 10: ENERGY

	SACE	ACARA
A Units of energy	} Topic 5 Sub-topic 5.5	Unit 1 Topic 2
B Rates of power		
C Energy in food		

In this chapter, students perform calculations involving energy in practical contexts.

Care should be taken to ensure students understand the units involved in measuring energy, as the units can be quite counter-intuitive at first. For example, students must understand that kilowatt hours is a unit of *energy*, whereas kilowatts is a unit of *power*, which is the *rate* of energy use.

Section C (Energy in food) should not be studied by South Australian students, as it is not part of their syllabus, and there is already a lot of material in the SACE Essential Mathematics course.

## CHAPTER 11: EARNING AND SPENDING

	SACE	ACARA
A Employment	Topic 2	
B Taxation		Sub-topic 2.1
C Budgets	Topic 2	
D Buying and selling	Sub-topic 2.2, 2.3	Unit 1 Topic 1

In the ACARA syllabus, the majority of content in this chapter is studied in General Mathematics rather than Essential Mathematics. Therefore, most of this chapter is only to be studied by South Australian students.

ACARA/WACE Essential Mathematics students should study Section D, to satisfy the syllabus requirements involving percentage changes, mark-up, discount, and GST.

## CHAPTER 12: INVESTING

	SACE	ACARA
A Financial institutions	Topic 6	
B Simple interest		Unit 2
C Compound interest		Topic 2
D Investment applications		Sub-topic 6.1, 6.2, 6.3
E Comparing interest rates		

As with Chapter 11, the majority of this chapter should only be studied by South Australian students.

ACARA/WACE students should only study Section B, to satisfy the syllabus requirement involving simple interest calculations.

In this chapter students will practise using the finance program on their calculator. This will be useful preparation for Year 12, when they will use the program for more complicated calculations involving annuities and mortgage repayments.

## CHAPTER 13: TABLES AND GRAPHS

	SACE	ACARA	
A Two-way tables	Topic 4	Unit 1	
B Line graphs		Sub-topic 4.2,	Topic 4
C Travel graphs		4.3	
D Step graphs			

In this chapter students must interpret information presented in a variety of tables and graphs.

Section C (Travel graphs) gives students an opportunity to apply the average speed formula learnt in Chapter 9 (Rates).

## CHAPTER 14: STATISTICS

	SACE	ACARA
A Types of data	Topic 4	
B Displaying categorical data	Sub-topic 4.1	
C Displaying numerical data	Topic 4	
D Stem plots	Sub-topic 4.3, 4.5	Unit 2 Topic 1
E Measuring the centre of data	Topic 4	
F Measuring the spread of data	Sub-topic 4.4	
G Box and whisker plots	Topic 4	
	Sub-topic 4.5	

This final chapter covers the remaining material from Topic 4 (Data in Context) not addressed in Chapter 13 (Tables and graphs).

In Section F, students should use technology to find the standard deviation of a data set. However, for students interested in how the standard deviation is calculated, an explanation is included within the chapter as an online link.