



## Year 12 – Mathematics Essential

This course is developed using the WA Curriculum as a guide. The order of the content and the time in which they are covered are only a guide. Circumstances may result in changes during the year. Kambalda West District High School reserves the right to alter the order the objectives are taught and time over which they are taught.

**Mathematics Essential** is a General course which focuses on using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This course provides the opportunity for students to prepare for post-school options of employment and further training.

### Vocabulary & Grammar

Below is a list of words and phrases that students should know: the meaning of; and be able to spell; by the end of term:

Percentage	Linear measure	Conversion graph	Distance
Graph	Dimensions	Column graph	Length
Rates	Mass	Quartiles	Speed
Fractions	Area	Outliers	Polygons
Decimals	Volume	Mean	Two-dimensional
BIMDAS	Kilojoules	Median	geometric shapes
Round up	Calories	Stem plots	Three-dimensional
Round down	Line graph	Time	solids
Inverse proportion	Sine	Ratios	Scale drawings
	Cos		Pythagoras' theorem
	Tan		

There is an expectation that students will make every effort to correctly use capitals, full stops, commas, semi colons, apostrophes, question marks and exclamation marks.



**COURSE OUTLINE 2022**  
**MATHEMATICS ESSENTIAL YEAR 12**

**Semester 1 – UNIT 3**

**Unit description**

This unit provides students with the mathematical skills and understanding to solve problems related to measurement, scales, plans and models, drawing and interpreting graphs and data collection. Students use the mathematical thinking process and apply the statistical investigation process. Teachers are encouraged to apply the content of the four topics in this unit: Measurement; Scales, plans and models; Graphs in practical situations; and Data collection, in a context which is meaningful and of interest to the students. A variety of approaches could be used to achieve this purpose. Possible contexts for this unit are Construction and design, and Medicine.

Week	Topics/Syllabus	Assessment	Resources
<b>Term 1</b>			
1	<b>Topic 3.3: Graphs in practical situations Cartesian plane</b> 3.3.1 demonstrate familiarity with Cartesian co-ordinates in two dimensions by plotting points on the Cartesian plane 3.3.2 generate tables of values for linear functions drawn from practical contexts 3.3.3 graph linear functions drawn from practical contexts with pencil and paper and with graphing software		
2-3	<b>Using graphs</b> 3.3.4 interpret and use graphs in practical situations, including travel graphs, time series and conversion graphs 3.3.5 draw graphs from given data to represent practical situations 3.3.6 describe trend as increasing or decreasing for time series data 3.3.7 identify the rate of change of the dependent variable, relating it to the difference pattern in a table and the slope of an associated line drawn from practical contexts 3.3.8 determine and describe the significance of the vertical intercept in practical situations 3.3.9 use the rate of change and the initial value to determine the linear relationship in practical situations 3.3.10 interpret the point of intersection and other important features of given graphs of two linear functions drawn from practical contexts; for example, the 'break-even' point	Task 1: Test 1 Week 3	
4-5	<b>Topic 3.4: Data collection - Census</b> 3.4.1 investigate the procedure for conducting a census 3.4.2 investigate the advantages and disadvantages of conducting a census <b>Surveys</b> 3.4.3 understand the purpose of sampling to provide an estimate of population values when a census is not used 3.4.4 investigate the different kinds of samples, for example, systematic samples, self-selected samples, simple random samples 3.4.5 recognise the advantages and disadvantages of these kinds of samples; for example, comparing simple random samples with self-selected samples <b>Simple survey procedure</b> 3.4.6 identify the target population to be surveyed 3.4.7 investigate questionnaire design principles; for example, simple language, unambiguous questions, consideration of number of choices, issues of privacy and ethics, freedom from bias	Task 2: Test 2 Week 5	
6-7	<b>Sources of bias</b> 3.4.8 describe the faults in the collection of data process 3.4.9 describe sources of error in surveys; for example, sampling error and measurement error 3.4.10 describe possible misrepresentation of the results of a survey due to the unreliability of generalising the survey findings to		

	<p>the entire population, for example, because of limited sample size or chance variation between samples</p> <p><b>3.4.11</b> describe errors and misrepresentation of the results of a survey, including examples of media misrepresentations of surveys and the manipulation of data to serve different purposes</p> <p><b>Bivariate scatterplots</b></p> <p><b>3.4.12</b> describe the patterns and features of bivariate data</p> <p><b>3.4.13</b> describe the association between two numerical variables in terms of direction (positive/negative), form (linear/non-linear) and strength (strong/moderate/weak)</p>		
8-10	<p><b>Trend lines</b></p> <p><b>3.4.14</b> identify the dependent and independent variable</p> <p><b>3.4.15</b> fit a trend line by eye</p> <p><b>3.4.16</b> interpret relationships in terms of the variables, for example, describe trend as increasing or decreasing</p> <p><b>3.4.17</b> use the trend line to make predictions, both by interpolation and extrapolation</p> <p><b>3.4.18</b> recognise the dangers of extrapolation</p> <p><b>3.4.19</b> distinguish between causality and association through examples</p>	Task 3: Practical Application 1 Due Week 8	
<b>Term 2</b>			
1-2	EST revision – Topic 3.3 and 3.4		
3	<b>Revision and Externally set task</b>	Task 5: EST Due Week 3,4,5	
4-5	<p><b>Right-angled triangles (no bearings)</b></p> <p><b>3.2.12</b> apply Pythagoras' theorem to solve problems in practical two-dimensional views</p> <p><b>3.2.13</b> apply the tangent ratio to determine unknown angles and sides in right-angled triangles</p> <p><b>3.2.14</b> work with the concepts of angle of elevation and angle of depression</p> <p><b>3.2.15</b> apply the cosine and sine ratios to determine unknown angles and sides in right-angle triangles</p> <p><b>3.2.16</b> solve problems involving trigonometric ratios in practical two-dimensional views</p> <p><b>Creating scale drawings</b></p> <p><b>3.2.1</b> understand and apply drawing conventions of scale drawings, such as scales in ratio, dimensions and labelling</p> <p><b>3.2.2</b> construct scale drawings by hand and by using appropriate software/technology</p> <p><b>Three dimensional objects</b></p> <p><b>3.2.3</b> interpret plans and elevation views of models</p> <p><b>3.2.4</b> sketch elevation views of different models interpret diagrams of three-dimensional objects</p> <p><b>3.2.5</b> determine actual measurement of angle, perimeters and areas from scale drawings</p>	Task 3: Practical Application 2 Due Week 5	
6-7	<p><b>Topic 3.1: Measurement</b></p> <p><b>Linear measure</b></p> <p><b>3.1.1</b> extend the calculation of perimeters to include polygons, circles and composites of familiar shapes</p> <p><b>Area measure</b></p> <p><b>3.1.2</b> calculate areas of parallelograms, trapeziums, circles and semi-circles</p> <p><b>3.1.3</b> determine the area of composite figures by decomposition into familiar shapes</p> <p><b>3.1.4</b> determine the surface area of familiar solids, including, cubes, rectangular and triangular prisms, spheres and cylinders</p> <p><b>3.1.5</b> use addition of the area of the faces of solids to determine the surface area of composite solids</p> <p><b>Volume and capacity</b></p> <p><b>3.1.6</b> recognise relations between volume and capacity, recognising that <math>1 \text{ cm}^3 = 1 \text{ mL}</math> and <math>1 \text{ m}^3 = 1 \text{ kL}</math></p> <p><b>3.1.7</b> calculate the volume and capacity of cylinders, pyramids and spheres</p>	Task 4: Statistical Investigation 1 Due Week 7	
<b>END OF SEMESTER 1</b>			

## Semester 2 – UNIT 4

### Unit description

This unit provides students with the mathematical skills and understanding to solve problems related to representing and comparing data, percentages, rates and ratios and time and motion. Students further develop the use of the mathematical thinking process and apply the statistical investigation process. The statistical investigation process should be explicitly taught in conjunction with the statistical content within this unit. Teachers are advised to apply the content of the four topics in this unit: Representing and comparing data; Percentages; Rates and ratios; and Time and motion, in a context which is meaningful and of interest to their students. Possible contexts for this unit are Transport and Independent living.

Week	Topics/Syllabus	Assessment	Resources
<b>Term 2</b>			
9-10	<p><b>Topic 4.1: Probability and relative frequencies</b>  <b>Probability expressions</b>                      4.1.1 interpret commonly used probability statements, including 'possible', 'probable', 'likely', 'certain'                      4.1.2 describe ways of expressing probabilities formally using fractions, decimals, ratios and percentages</p> <p><b>Simulations</b>                      4.1.3 perform simulations of experiments using technology                      4.1.4 recognise that the repetition of chance events is likely to produce different results                      4.1.5 recognise the law of large numbers and identify relative frequency as probability                      4.1.6 identify factors that may cause the simulation to no longer model the real world event</p>		
<b>Term 3</b>			
1-2	<p><b>Simple probabilities in practical situations</b>                      4.1.7 construct a sample space for an experiment which represents a practical situation                      4.1.8 use a sample space to determine the probability of outcomes for an experiment                      4.1.9 use arrays or tree diagrams to determine the outcomes and the probabilities for experiments</p>	Task 6: Test 3 Due Week 3	
3-4	<p><b>Probability applications</b>                      4.1.10 identify situations in real-life contexts where probability is used for decision making                      4.1.11 determine and use probabilities (relative frequencies) from given data to predict proportions and the number of outcomes that are likely to occur</p>	Task 7: Statistical Investigation 2 Week 5	
4-5	<p><b>Topic 4.3: Loans and compound interest</b>  <b>Compound interest</b>                      4.3.1 review the principles of simple interest                      4.3.2 understand the concept of compound interest as a recurrence relation                      4.3.3 consider similar problems involving compounding; for example, population growth                      4.3.4 use technology to calculate the future value of a compound interest loan or investment and the total interest paid or earned                      4.3.5 use technology to compare, numerically and graphically, the growth of simple interest and compound interest loans and investments                      4.3.6 use technology to investigate the effect of changing the interest rate and the number of compounding periods on the future value of a loan or investment</p>		
6	<p><b>Reducing balance loans (compound interest loans with periodic repayments)</b>                      4.3.7 use technology and a recurrence relation to model a reducing balance loan</p>	Task 8: Test 4 Week 7	

	4.3.8 investigate the effect of the interest rate and repayment amount on the time taken to repay a loan		
7-10	<p><b>Topic 4.2: Earth geometry and time zones</b></p> <p><b>Location</b></p> <p>4.2.1 locate positions on the earth's surface given latitude and longitude using a range of methods; for example, a global positioning system (GPS), a globe, an atlas and digital technologies</p> <p>4.2.2 use the arc length formula to calculate distances between two places on Earth on the same longitude</p> <p>4.2.3 determine distances between two places on Earth using appropriate technology</p> <p><b>Time</b></p> <p>4.2.4 understand the link between longitude and time</p> <p>4.2.5 solve problems involving time zones in Australia and neighbouring nations making any necessary allowances for daylight saving</p> <p>4.2.6 solve problems involving Greenwich Mean Time and the International Date Line</p> <p>4.2.7 determine time differences between two places on Earth</p>	Task 9: Practical Application 2 Week 9	
Term 4			
Week 1-2	<p><b>Time</b></p> <p>4.2.8 solve problems associated with time zones; for example, internet and phone usage</p> <p>4.2.9 solve problems relating to travelling east and west, incorporating time zone changes</p>		
<b>END OF SEMESTER 2</b>			



**ASSESSMENT OUTLINE 2022**  
**MATHEMATICS ESSENTIAL YEAR 12**

A number of assessments will be used throughout the term to identify the students understanding in the course and be used to determine a grade. Student achievement will be reported using the following descriptors.

**Semester 1**

Assessment Type <i>SCSA Weighting</i>	Task Description	KWDHS Weighting	Set/Due Date
Response 20%	Task 1: Test 1 <b>Topic 3.3.1-3.3.10: Graphs in practical situations</b>	10%	Term 1, Week 3
	Task 2: Test 2 <b>Topic 3.4.1-3.4.7: Data collection</b>	10%	Term 1, Week 5
Standardised Test	OLNA		Term 1 Week 5
Practical Application/Statistical Investigation Process 25%	Task 3: Practical Application 1 <b>Topic 3.1.1-3.1.5: Measurement</b>	12.5%	Term 2, Week 5
	Task 4: Statistical Investigation 1 <b>Topic 3.1.6-3.1.: Measurement</b>	12.5%	Term 2 Week 7
Externally Set Task 15%	<b>Task 5: Externally Set Task</b>	15%	Term 2 , Week 3,4,5

**Semester 2**

Assessment Type <i>SCSA Weighting</i>	Task Description	KWDHS Weighting	Set/Due Date
Response 20%	Task 6: Test 3 <b>Topic 4.1.1-4.1.6: Probability and relative frequencies</b>	10%	Term 3, Week 3
	Task 8: Test 4 <b>Topic 4.1.6-4.1.8: Probability and relative</b>	10%	Term 3, Week 7
Standardised Test	OLNA		Term 1 Week 5
Practical Application/Statistical Investigation Process 20%	Task 9: Practical Application 2 <b>Topic 4.2.1-4.1.3: Earth geometry and time zones</b>	10%	Term 3, Week 9
	Task 7: Statistical Investigation 2 <b>Topic 4.1.10-4.1.11: Probability and relative frequencies</b>	10%	Term 3, Week 5

It is expected that all assessments will be completed to the best of your ability and be submitted by the deadlines set. Please make yourself aware of the Assessment Policy as failure to meet deadlines has severe consequences.

Grade	Description	The student demonstrates achievement that:
<b>A</b>	Excellent	has greatly exceeded the expected standard. Achievement is well beyond what is expected at this year level.
<b>B</b>	Good	exceeds the expected standard.
<b>C</b>	Satisfactory	at the expected standard.
<b>D</b>	Limited	is below the expected standard.
<b>E</b>	Very Low	is below the minimum acceptable for this year level.

Student Signature: \_\_\_\_\_

Parent/Guardian Signature: \_\_\_\_\_