Year 9 – Mathematics

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.

- 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. The achievement standards reflect the content and encompass the proficiencies.

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:

Compound interest Simple interest Quotient Index laws Binomial products Linear equations Linear inequalities	Exponentials Volume Surface area Proofs Congruent triangles Similarity Pythagoras theorem Trigonometry	Box plots Histograms Dot plots Scatter plots Bivariate numerical data Independent variable	Two step chance experiment Three step chance experiment Simultaneous equations Quadratics

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.

Topics

Number and Algebra

- Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)
- Apply index laws to numerical expressions with integer indices (ACMNA209)
- Express numbers in scientific notation
- Solve problems involving simple interest
- Extend and apply the index laws to variables, using positive integer indices and the zero index
- Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate
- Find the distance between two points located on the Cartesian plane using a range of strategies, including graphing software (ACMNA214)
- Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)
- Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)
- Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296)

Measurement and Geometry

- Calculate areas of composite shapes (ACMMG216)
- Calculate the surface area and volume of cylinders and solve related problems (ACMMG217)
- Solve problems involving the surface area and volume of right prisms (ACMMG218)
- Investigate very small and very large time scales and intervals (ACMMG219)
- Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220)
- Solve problems using ratio and scale factors in similar figures (ACMMG221)
- Investigate Pythagoras' Theorem and its application to solving simple problems involving right-angled triangles (ACMMG222)
- Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223)
- Apply trigonometry to solve right-angled triangle problems (ACMMG224)

Statistics and Probability

- List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225)
- Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226)
- Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians (ACMSP227)
- Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228)
- Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282)
- Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283)

COURSE OUTLINE 2022

MATHEMATICS YEAR 9

Semester 1

Week	Topics/Syllabus	Assessment	Resources
	Term 1		
1-2	**Introduction** **Number and algebra - Real numbers** • Apply index laws to numerical expressions with integer indices • Express numbers in scientific notation • Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems		
3-6	**Number and algebra - Patterns and algebra** • Extend and apply the index laws to variables, using positive integer indices and the zero index • Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate	**Task 1:** Investigation 1 Week 5	
7-8	**Number and algebra - Money and financial mathematics** • Solve problems involving simple interest		
9-10	**Number and algebra - Linear and non-linear relationships** • Find the distance between two points located on the Cartesian plane using a range of strategies, including graphing software • Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software	**Task 2:** Test 1 Week 9	
	Term 2		
1-4	**Number and algebra - Linear and non-linear relationships** • Sketch linear graphs using the coordinates of two points and solve linear equations • Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations	**Task 3:** Investigation 2 Week 4	
5-6	**Measurement and Geometry - Units of measurement** • Calculate areas of composite shapes		
7-8	**Measurement and Geometry - Units of measurement** • Calculate the surface area and volume of cylinders and solve related problems	**Task 4:** Test 2 Week 7	
9-10	**Measurement and Geometry - Units of measurement** • Solve problems involving the surface area and volume of right prisms		
	END OF SEMESTER 1		

Semester 2

Week	Topics/Syllabus	Assessment	Resources
Term 3			
1	**Measurement and geometry – Units of Measurement** Investigate very small and very large time scales and intervals		
2-3	**Measurement and geometry – Units of Measurement** Solve problems involving the surface area and volume of right prisms Investigate very small and very large time scales and intervals		
4-5	**Measurement and geometry – Pythagoras and trigonometry** Investigate Pythagoras' Theorem and its application to solving simple problems involving right-angled triangles	**Task 5:** Investigation 3 Week 5	
6-7	**Measurement and geometry –** Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles Apply trigonometry to solve right-angled triangle problems		
8-10	**Statistics and probability - Chance** • List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events • Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' • Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians	**Task 6:** Test 3 Week 8	
Term 4			
1-2	**Measurement and geometry – Geometric reasoning** • Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar • Solve problems using ratio and scale factors in similar figures		
3-4	**Statistics and probability - Data representation and interpretation** • Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources	**Task 7:** Investigation 4 Week 4	
5-6	**Statistics and probability - Data representation and interpretation** • Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal'		
7-10	**Statistics and probability - Data representation and interpretation** • Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread	**Task 8:** Test 4 Week 7	
END OF SEMESTER 2			

ASSESSMENT OUTLINE 2022

MATHEMATICS YEAR 9

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	Task Description	KWDHS Weighting	Due Date
Diagnostic Test	**Paul Swan Basic Number Facts** (Fluency Test - One Minute) **PAT Maths Assessment**		*Term 1, Week 2 and 3*
Investigation	**Task 1:** Investigation 1. **Number and algebra - Patterns and algebra**	15%	*Term 1, Week 5*
Test	**Task 2:** Test 1. **Number and algebra - Linear and non-linear relationships**	10%	*Term 1, Week 9*
Standardised Test	**NAPLAN**		*Term 2, Week 3 and 4*
Diagnostic Test	**PAT Maths Assessment**		*Term 2, Week 4 and 5*
Investigation	**Task 3:** Investigation 2. **Number and algebra - Linear and non-linear relationships**	15%	*Term 2, Week 4*
Test	**Task 4:** Test 2. **Measurement and Geometry - Units of measurement**	10%	*Term 2, Week 7*

Semester 2

Assessment Type	Task Description	KWDHS Weighting	Due Date
Diagnostic Test	**Paul Swan Basic Number Facts** (Fluency Test - One Minute)		*Term 3, Week 2 and 3*
Investigation	**Task 5:** Investigation 3. **Measurement and geometry – Pythagoras and trigonometry**	15%	*Term 3, Week 5*
Test	**Task 6:** Test 3. **Statistics and probability - Chance**	10%	*Term 3, Week 8*
Diagnostic Test	**Paul Swan Basic Number Facts** (Fluency Test - One Minute) **PAT Maths Assessment**		*Term 4, Week 2 and 3*
Investigation	**Task 7:** Investigation 4. **Statistics and probability - Data representation and interpretation**	15%	*Term 4, Week 4*
Test	**Task 8:** Test 4. **Statistics and probability - Data representation and interpretation**	10%	*Term 4, Week 7*

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:
A	Excellent	has greatly exceeded the expected standard. Achievement is well beyond what is expected at this year level.
B	Good	exceeds the expected standard.
C	Satisfactory	at the expected standard.
D	Limited	is below the expected standard.
E	Very Low	is below the minimum acceptable for this year level.

Student Signature: _____ Parent/Guardian Signature: _____