

Term 2: Unit 3 Algebra**Year 7 Australian Curriculum Achievement Standard:**

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. **Students represent numbers using variables.** They **connect the laws and properties for numbers to algebra.** They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

Students use fractions, decimals and percentages, and their equivalences. They express one quantity as a fraction or percentage of another. **Students solve simple linear equations and evaluate algebraic expressions after numerical substitution.** They assign ordered pairs to given points on the Cartesian plane. Students use formulas for the area and perimeter of rectangles and calculate volumes of rectangular prisms. Students classify triangles and quadrilaterals. They name the types of angles formed by a transversal crossing parallel line. Students determine the sample space for simple experiments with equally likely outcomes and assign probabilities to those outcomes. They calculate mean, mode, median and range for data sets. They construct stem-and-leaf plots and dot-plots.

Unit Overview:

In this unit students will learn to represent numbers using index notation. They will learn about perfect square numbers and be introduced to the radical sign when learning about square roots. They will be introduced to algebra and see how the laws and properties of numbers can be applied to variables. They will learn to solve simple linear equations both by inspection and algebraically.

Assessment Overview:

Item 3: Algebra (Exam, technology-free)

Scheduled – Week 5, In-Class

Length – 40 minutes

Key Skills:

Represent whole numbers using as powers of products prime numbers

Use square roots of perfect square numbers

Apply concept of variables as a way of representing numbers using letters

Create algebraic expressions and evaluate them by substituting a given value for each variable

Extend and apply the laws and properties of arithmetic to algebraic terms and expressions

Solve simple linear equations

Conditions:

Refer to KSHS exam protocol

Guaranteed Vocabulary:	Design Question Four Strategy	Design Question Five Strategy	21 st Century Skill:
Index Prime Composite Perfect square Square root Order of operations Algebra Variable Expression Evaluate Substitution Terms Equation Solve	Element 9: <u>Using Structured Practice Sessions</u> Students will already have some knowledge of prime, composite and square numbers, they will revise and extend this knowledge through opportunities for guided, modelled and collaborative learning. Students will engage in structured practice sessions prior to testing and assessment.	Element 12: <u>Engaging students in Cognitively Complex Tasks</u> Students will be able to explain the conclusions that they have generated. Teachers will engage students in problem-solving tasks that require them to make decisions in order to test hypotheses.	Critical thinking Creative thinking Communication Collaboration and teamwork Personal and Social skills
Guaranteed Skills/Language Features:	Reading Comprehension Skill and Strategy	Cognitive Verbs	ICT to Enhance Learning:
<p>Express whole numbers using as powers of products prime numbers</p> <p>Use square roots of perfect square numbers</p> <p>Apply concept of variables as a way of representing numbers using letters</p> <p>Create algebraic expressions and evaluate them by substituting a given value for each variable</p> <p>Extend and apply the laws and properties of arithmetic to algebraic terms and expressions</p> <p>Solve simple linear equations</p>	<p>Reading as a Mathematician</p> <p>Students will complete the following steps when starting a problem:</p> <ol style="list-style-type: none"> 1. Scan the whole problem. 2. Identify the task. It could be a: 3. Reread the problem. What is important to help you solve the problem? 4. Translate - (create a mathematical model) 5. Solve the problem. 	<p>Retrieval and comprehension: Define Explain Use</p> <p>Analytical processes: Apply</p> <p>Knowledge utilisation: Express Create Solve Investigate Evaluate</p>	Mathspace Sumdog

Strands and Sub-Strands	Australian Curriculum Content Descriptors	Australian Curriculum Elaborations	Kirwan High Goals (SF) I can...	Kirwan High Goals (CF/CU) I can...
Patterns and Algebra	Introduce the concept of variables as a way of representing numbers using letters	<ul style="list-style-type: none"> understanding that arithmetic laws are powerful ways of describing and simplifying calculations and that using these laws leads to the generality of algebra 	<ul style="list-style-type: none"> recall basic algebra vocabulary identify terms, constants, variables and coefficients in a simple expression 	<ul style="list-style-type: none">
	Create algebraic expressions and evaluate them by substituting a given value for each variable	<ul style="list-style-type: none"> using authentic formulas to perform substitutions 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> translate from words to an algebraic expression create a worded representation of an expression solve real-life problems using substitution
	Extend and apply the laws and properties of arithmetic to algebraic terms and expressions	<ul style="list-style-type: none"> identifying order of operations in contextualised problems, preserving the order by inserting brackets in numerical expressions, then recognising how order is preserved by convention moving fluently between algebraic and word representations as descriptions of the same situation 	<ul style="list-style-type: none"> understand algebraic conventions for multiplication and division simplify basic algebraic expressions 	<ul style="list-style-type: none"> create algebraic expressions to solve real-life problems
	Solve simple linear equations	<ul style="list-style-type: none"> solving equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation using substitution to check solutions investigating a range of strategies to solve equations 	<ul style="list-style-type: none"> solve one step equations using inspection or algebra 	<ul style="list-style-type: none"> solve equations involving multiple steps using any method

Possible Habit of Mind:

<p>Exploring Meaning of the HOM By the end of this unit students will be able to:</p>	<p>Expanding Capacity for using the HOM By the end of this unit students will be able to:</p>	<p>Increasing Alertness for the HOM By the end of this unit students will be able to:</p>	<p>Extending Values of the HOM By the end of this unit students will be able to:</p>	<p>Building Commitment towards the HOM By the end of this unit students will be able to:</p>
--	--	--	---	---

General Capabilities: This unit provides opportunities for students to engage in following capabilities:

<p>Literacy</p> <ul style="list-style-type: none"> <input type="checkbox"/> Comprehending texts through listening, reading and viewing <input type="checkbox"/> Composing texts through speaking, writing and creating <input type="checkbox"/> Text knowledge <input type="checkbox"/> Grammar knowledge <input checked="" type="checkbox"/> Word knowledge <input type="checkbox"/> Visual knowledge <p>Numeracy</p> <ul style="list-style-type: none"> <input type="checkbox"/> Estimating and calculating with whole numbers <input checked="" type="checkbox"/> Recognising and using patterns and relationships <input type="checkbox"/> Using fractions, decimals, percentages, ratios and rates <input type="checkbox"/> Using spatial reasoning <input type="checkbox"/> Interpreting statistical information <input type="checkbox"/> Using measurement 	<p>ICT</p> <ul style="list-style-type: none"> <input type="checkbox"/> Applying social and ethical protocols and practices when using ICT <input type="checkbox"/> Investigating with ICT <input type="checkbox"/> Creating with ICT <input type="checkbox"/> Communicating with ICT <input type="checkbox"/> Managing and operating ICT <p>Critical and creative thinking</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Inquiring - identifying, exploring and organising information and ideas <input type="checkbox"/> Generating ideas, possibilities and actions <input type="checkbox"/> Reflecting on thinking and processes <input type="checkbox"/> Analysing, synthesising and evaluating reasoning and procedures 	<p>Personal and social capability</p> <ul style="list-style-type: none"> <input type="checkbox"/> Self-awareness <input checked="" type="checkbox"/> Self-management <input type="checkbox"/> Social awareness <input type="checkbox"/> Social management <p>Ethical understanding</p> <ul style="list-style-type: none"> <input type="checkbox"/> Understanding ethical concepts and issues <input type="checkbox"/> Reasoning in decision making and actions <input type="checkbox"/> Exploring values, rights and responsibilities <p>Intercultural understanding</p> <ul style="list-style-type: none"> <input type="checkbox"/> Recognising culture and developing respect <input type="checkbox"/> Interacting and empathising with others <input type="checkbox"/> Reflecting on intercultural experiences and taking responsibility
---	--	--

Cross Curriculum Priorities:

<ul style="list-style-type: none"> <input type="checkbox"/> Aboriginal and Torres Strait Islander histories and cultures 	<ul style="list-style-type: none"> <input type="checkbox"/> Asia and Australia’s engagement with Asia 	<ul style="list-style-type: none"> <input type="checkbox"/> Sustainability
---	--	---

Differentiation [for small groups or individuals]:

The learning experiences within this unit can be differentiated by increasing:

- The frequency of exposure for some students
- The intensity of teaching by adjusting the group size
- The duration needed to complete tasks and assessment

Teachers are encouraged to use hands on, visual approaches or real life where necessary. This provides clear links to the outside world and provides concrete examples for students. Increasing the complexity of problems will also allow an opportunity for higher order thinking and for students to solve problems with multiple steps.