

| Unit Description | Unit Objectives |
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| <p>In Unit 1, students will develop mathematical understandings and skills to solve problems relating to the topics:</p> <ul style="list-style-type: none"> • Topic 1: Consumer arithmetic • Topic 2: Shape and measurement • Topic 3: Linear equations and their graphs. <p>Consumer arithmetic reviews the concepts of rate and percentage change in the context of earning and managing money, and provides an opportunity for the use of spreadsheets. Shape and measurement builds on and extends the knowledge and skills students developed in the P–10 Australian Curriculum with the concept of similarity and problems involving simple and compound geometric shapes. Students apply these skills in a range of practical contexts, including those involving three-dimensional shapes. Linear equations and their graphs uses linear equations and straight-line graphs, as well as piece-wise linear graphs and step graphs, to model and analyse practical situations.</p> | <p>Students will:</p> <ol style="list-style-type: none"> 1. select, recall and use facts, rules, definitions and procedures drawn from all Unit 1 topics 2. comprehend mathematical concepts and techniques drawn all Unit 1 topics 3. communicate using mathematical, statistical and everyday language and conventions 4. evaluate the reasonableness of solutions 5. justify procedures and decisions by explaining mathematical reasoning 6. solve problems by applying mathematical concepts and techniques drawn from all Unit 1 topics. |

| Assessment Plan: | | | | |
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| Task | % | Objectives to be assessed | Conditions | Date |
| IA1 – Internal Assessment 1 PSMT – Unit 1 – Topic 1 | 20 | As above – all objectives included on assessment item | 4 weeks - including 3 hours of class time | Term 1 Week 8 |
| IA2 – Internal Assessment 2 Examination – <i>representatively sample all Unit 1 topics not assessed by the PSMT</i> | 15 | As above – all objectives included on assessment item | Closed Book QCAA formula sheet required Technology Active 120 minutes + 5 minutes perusal | Term 2 Week 5 |

Monitoring and Reviewing:

| Strategies for Monitoring Student Progress | Date | Planned Reviews at Key Intervals | Date |
|---|-------------|--|------------------------------------|
| Student Summary Rule book – separate book following through all units Proficiency scales KNOW and be able to DO tables (KDT) Regular vocabulary review, HW – weekly review, Formative items Common mistakes recognition Use of online support – Education Perfect, Khan Academy, Text-based online support Graphic organisers – e.g. mind maps, Frayer model, KWL (what I know, what I want to know, what I have learnt) | | 10 minute review (weekly quiz) during one lesson a week Mathspace quizzes - weekly Formative items | Each week Week 5 Week 10 |

Underpinning Factors:

| Guaranteed Vocabulary: | Literacy Skills | 21 st Century Skill/s | |
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| <ul style="list-style-type: none"> ▪ rates, percentages ▪ percentage increase/decrease ▪ mark-up, discount ▪ wages, salary, income ▪ overtime, allowances ▪ commission, piecework ▪ budget ▪ unit cost ▪ GST ▪ profit & loss ▪ simple interest, compound interest ▪ currency, exchange rate ▪ dividend, portfolio, share ▪ price-to-earnings ratio ▪ piece-wise linear graphs ▪ step graphs | <ul style="list-style-type: none"> ▪ perimeter, area, surface area ▪ volume, capacity ▪ sector ▪ composite ▪ circle, rectangle, triangle, square, trapezium, parallelogram ▪ sphere, prism, pyramid, cylinder, cone ▪ similar triangles ▪ scale factor ▪ scale drawing ▪ shadow stick ▪ clinometer ▪ linear equation ▪ variables ▪ slope/gradient ▪ intercept ▪ equation ▪ plot ▪ simultaneous equations ▪ intersection | <p>Written</p> <ul style="list-style-type: none"> ▪ using technical / procedural vocabulary ▪ using conventions (symbols, abbreviations) <ul style="list-style-type: none"> - %, x^2, x^3, \sqrt{x}, π, mm, m, km, L, cm^2 <p>Oral</p> <ul style="list-style-type: none"> ▪ articulating patterns and generalisations ▪ putting thoughts into words <p>Visual</p> <ul style="list-style-type: none"> ▪ budget table, spreadsheets ▪ using diagrammatic visualisations including right-angled triangles, nets (of solids), diagrams of life-related situations ▪ using maps, scale drawings ▪ using linear graphs, intersecting linear graphs ▪ piece-wise linear graphs ▪ step graphs | <p>Critical thinking problem-solving</p> <ul style="list-style-type: none"> - decision-making, reasoning, problem solving - reflecting and evaluating, intellectual flexibility - analytical thinking <p>Communication</p> <ul style="list-style-type: none"> - effective oral and written communication - using language, symbols and texts <p>Personal and social skills</p> <ul style="list-style-type: none"> - management (self, career, time, planning and organising) - citizenship - adaptability/flexibility - citizenship - ethical (and moral) understanding <p>Creative thinking</p> <ul style="list-style-type: none"> - identifying alternatives - generating and applying new ideas - seeing or making new links <p>Collaboration and teamwork</p> <ul style="list-style-type: none"> - relating to others (interacting with others) - community connections - participating and contributing - recognising and using diverse perspectives <p>ICT skills</p> <ul style="list-style-type: none"> - accessing and analysing information - being productive users of technology, including using spreadsheets - operations and concepts |
| | | <p>Numeracy Skills</p> <ul style="list-style-type: none"> ▪ identifying the mathematical information ▪ calculating percentages, square roots and square ▪ recognising relevant mathematical data on government websites ▪ applying mathematical knowledge in a range of contexts ▪ applying mathematical knowledge to solve life-related problems involving perimeter, area, surface area, volume and capacity ▪ identifying linear equations and graphs ▪ analysing and applying linear graphs ▪ interpreting intersecting linear graphs ▪ sketching piece-wise linear graphs and step graphs | <p>Cognitive Verbs</p> <p>Retrieval and Comprehension: describe, document, calculate, select, explain, use, identify, summarise.</p> <p>Analysis: determine, compare, comparing, discriminate, apply, analyse, consider.</p> <p>Knowledge Utilisation: investigate, evaluate, discuss, develop, devise, justify, generate, comment, make decisions, predict.</p> |

TEACHING AND LEARNING PLAN:

| Hours/Weeks | Unit Objectives | Subject Matter | Learning Experiences [reflecting DQ 3, 4, 5 and 6] | Possible Resources |
|---|--------------------|--|--|---|
| <p>Unit 1 Weeks 1-4</p> <p>Term 1 Week 1 - 4 13 hours</p> | <p>1,2,3,4,5,6</p> | <p>CONSUMER ARITHMETIC Application of rates, percentages and use of spreadsheets (14 hours)</p> <ul style="list-style-type: none"> • review definitions of rates and percentages • calculate weekly or monthly wages from an annual salary and wages from an hourly rate, including situations involving overtime and other allowances and earnings based on commission or piecework • calculate payments based on government allowances and pensions, such as youth allowances, unemployment, disability and study • prepare a personal budget for a given income, taking into account fixed and discretionary spending • compare prices and values using the unit cost method • apply percentage increase or decrease in various contexts, e.g. determining the impact of inflation on costs and wages over time, calculating percentage mark-ups and discounts, calculating GST, calculating profit or loss in absolute and percentage terms, and calculating simple and compound interest • use currency exchange rates to determine the cost in Australian dollars of purchasing a given amount of a foreign currency, such as US\$1500, or the value of a given amount of foreign currency when converted to Australian dollars, such as the value of €2050 in Australian dollars • calculate the dividend paid on a portfolio of shares, given the percentage dividend or dividend paid per share, for each share; and compare share values by calculating a price-to-earnings ratio • use a spreadsheet to display examples of the above computations when multiple or repeated computations are required, e.g. preparing a wage sheet displaying the weekly earnings of workers in a fast-food store where hours of employment and hourly rates of pay may differ, preparing a budget, or investigating the potential cost of owning and operating a car over a year. | <p>Refer to QCAA TLAP</p> | <p>Textbook -General Mathematics – Units 1 & 2 (Cambridge)</p> <p>Digital version also available</p> |
| <p>Unit 1 Weeks 5-9</p> <p>Term 1 Week 5 2 hours</p> <p>Week 6 to 8 6 hours</p> | <p>1,2,3,4,5,6</p> | <p>Shape and measurement Pythagoras' s theorem (3 hours)</p> <ul style="list-style-type: none"> • review Pythagoras' theorem and use it to solve practical problems in two dimensions and simple applications in three dimensions. <p>Mensuration (8 hours)</p> <ul style="list-style-type: none"> • solve practical problems requiring the calculation of perimeters and areas of circles, sectors of circles, triangles, rectangles, trapeziums, parallelograms and composites • calculate the volumes and capacities of standard three-dimensional objects, including spheres, rectangular prisms, cylinders, cones, pyramids and composites in practical situations, such as the volume of water contained in a swimming pool • calculate the surface areas of standard three-dimensional objects, e.g. spheres, rectangular prisms, cylinders, cones, pyramids and composites in practical situations, such as the surface area of a cylindrical food container. | | |

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| <p>Term 1 Week 8 to 9 5 hours</p> | | <p>Similar figures and scale factors (7 hours)</p> <ul style="list-style-type: none"> • review the conditions for similarity of two-dimensional figures, including similar triangles • use the scale factor for two similar figures to solve linear scaling problems • obtain measurements from scale drawings, such as maps or building plans, to solve problems • obtain a scale factor and use it to solve scaling problems involving the calculation of the areas of similar figures, including the use of shadow sticks, calculating the height of trees, use of a clinometer • obtain a scale factor and use it to solve scaling problems involving the calculation of surface areas and volumes of similar solids. | | |
| <p>Unit 1 Weeks 10-14</p> <p>Term 1 Week 10 3.5 hours</p> <p>Term 2 Weeks 1 to 3 7 hours</p> <p>Term 2 Week 3, 4 3.5 hours</p> | <p>1,2,3,4,5,6</p> | <p>Linear equations and their graphs</p> <p>Linear equations (5 hours)</p> <ul style="list-style-type: none"> • identify and solve linear equations, including variables on both sides, fractions, non-integer solutions • develop a linear equation from a description in words. <p>Straight line graphs and applications (7 hours)</p> <ul style="list-style-type: none"> • construct straight-line graphs using $y=mx+c$ both with and without the aid of technology • determine the slope and intercepts of a straight-line graph from both its equation and its plot • interpret, in context, the slope and intercept of a straight-line graph used to model and analyse a practical situation • construct and analyse a straight-line graph to model a given linear relationship, such as modelling the cost of filling a fuel tank of a car against the number of litres of petrol required. <p>Piece-wise linear graphs and step graphs (5 hours)</p> <ul style="list-style-type: none"> • sketch piece-wise linear graphs and step graphs, using technology where appropriate • interpret piece-wise linear and step graphs used to model practical situations. <p>Simultaneous linear equations and their applications (6 hours)</p> <ul style="list-style-type: none"> • solve a pair of simultaneous linear equations in the format $y=mx+c$, using technology when appropriate; they must solve equations algebraically, graphically and by substitution, not using the elimination method • solve practical problems that involve finding the point of intersection of two straight-line graphs, such as determining the break-even point where cost and revenue are represented by linear equations. | | |