**STAGE 2 ESSENTIAL MATHEMATICS PROGRAM 1**

This program is for a cohort of students studying Stage 2 Essential Mathematics. It is assumed that students have completed Topics 1-6 from Stage 1 Essential Mathematics.

**Topic 1 – Scales, Plans, and Models (4 Weeks) – Non-examined topic**

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **week** | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 1-1 | 1.1  Geometry | Properties of shapes:   * 2D shapes: vertices and edges * 3D shapes: faces, vertices, and edges. |  |
| 1-2 | 1.1 and 1.2 | Nets: Use of nets to construct 3D solids – naming solids, recognition of 2D shapes used to form each solid, drawing a net for a given 3D solid.  Scale: Terminology Notations: symbols and abbreviations |  |
| 1-3 | 1.2  Scale | Displaying measurements from field observations with an appropriate scale.  Bearings: applied to scaled information in context e.g. search and rescue.  Error: accuracy of instruments and effects of error on calculations. |  |
| 1-4 | 1.1 and 1.2 | Problem solving with scaled representations and construction of scaled representations. | **SAT 1 Scales, Plans, and Models (1.1 and 1.2)**  **No calculator - No notes** |

**Topic 3 – Business Applications (6 weeks) – Non-examined topic**

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **Week** | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 1-5 | 3.1  Planning a Business Premises  3.2  Costing Calculations | Planning a business:   * consideration of location and facilities for variety of retail businesses * cost of premises (without ET\*) per time period (e.g. weekly, fortnightly, etc.)   Costing of goods:   * manufacturer to wholesaler to retail * terminology - GST / Input Tax Credits / profit margin etc. | \* ET = electronic technology |
| 1-6 | 3.2  Costing Calculations | Pricing structures calculations:   * Trade discount based on payment terms e.g. 7/10, 5/21, n/30 * Series discount e.g. trade, end-of-line sale, etc. * GST * Profit margin.   Other factors affecting viability:   * depreciation – calculation for straight-line and reducing balance and construction of graphs * discussion of insurance - WorkCover and public liability, etc. * input tax credits. |  |
| 1-7 | 3.2 | Costing calculations and introduction to fixed and variable costs |  |
| 1-8 | 3.2 | Calculating break-even point:   * graphically * marginal income.   Business viability:   * constructing profit/loss statements (including COGS) * profit projections. | **FOLIO 1: Break-even investigation** |
| 1-9 | 3.2 and 3.3  Business Structures and Taxation | Breakeven, profit/loss and taxation calculations and comparisons   * Compare tax payable under sole/partnership structures with varying proportioning of ownership |  |
| 1-10 | 3.3 | Taxation calculations and comparisons   * Sole, partnership and company business structures * Compare tax payable under sole/partnership structures with varying proportioning of ownership. | **SAT 2 – Business Applications (3.1-3.3)**  **Calculator permitted + 1 side of one A4 page notes** |

**Topic 2 – Measurement (6 Weeks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **week** | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 1-11 | 2.1  Linear Measure | Conversions: linear unit metric conversions. Discuss link between metric and imperial units and conversions (e.g. yard, m, 1m = 3’ = 1yd, etc.)  Estimation: measure lengths in the field assessing student accuracy.  Perimeter: calculations of simple and composite shapes. |  |
| 2-1 | 2.1  Linear Measure | Calculating lengths of missing sides:   * Pythagoras Theorem * Right-angled triangle trigonometric ratios – sine, cosine and tangent * Non right-angled triangles: sine and cosine rules.   Calculating unknown angles using sine and cosine rules. |  |
| 2-2 | 2.2  Area Measure | Conversions: metric area unit conversions and between metric and imperial units (e.g. km2 to Ha, etc.)  Calculations of area.  Regular and irregular triangles, quadrilaterals, sectors, circles and composites of these shapes.  Irregular non-polygonal shapes: use Simpson’s rule to calculate irregular areas (with curved outlines) e.g. fish ponds, garden beds, golf greens, dams. |  |
| 2-3 | 2.2  Area Measure | Calculation of surface area of cubes, prisms, pyramids, and spheres  Simple composites of these. |  |
| 2-4 | 2.3  Mass, Volume, and Capacity | Conversions: units of mass, volume, and capacity  Calculations: volume of cubes, prisms, pyramids, cones, and spheres  Density: Units, e.g. g/cm3  Calculations: Use density to determine volume or mass of a specified material. |  |
| 2-5 | 2.3  Mass, Volume, and Capacity | Density: Units, e.g. g/cm3  Calculations: Use density to determine volume or mass of a specified material | **SAT 3 – Measurement (2.1-2.3)**  **Part A – No calculator or notes**  **Part B – Calculator permitted and formula sheet provided.** |

**Topic 4 – Statistics (6 weeks)**

|  |  |  |  |
| --- | --- | --- | --- |
| Term  week | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 2-6 | 4.1  Sampling from Populations | Terminology  Sampling methods  Bias and errors |  |
| 2-7 | 4.2  Analysis and Representation of Sets of Data | Measures of centre and spread  Outliers  Stem-and-leaf plots and Box-and-whisker diagrams | **SAT 4 – Statistics (4.1, 4.2)**  **Calculator permitted 1 A4 page notes** |
| 2-8 | 4.3  Linear Correlation | Terminology: dependent and independent variables  Scatterplots: Association strength, form, and direction; Effect of outliers  Causality, Validity  Degree of relationship: Pearson’s correlation coefficient (***r***), Least squares regression (“line of best fit”), Coefficient of determination (***r2***). |  |
| 2-9 | Revision | FORMATIVE mid-year EXAM REVISION |  |
| 2-10 | Revision | FORMATIVE mid-year EXAM |  |

**Topic 4 – Statistics (6 weeks) continued**

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **week** | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 3-1 | 4.3  Linear Correlation | Applying least squares regression line: extrapolate and interpolate values (making predictions). |  |
| 3-2 | 4.3  Linear Correlation | Folio 2: Students choose a theme to investigate and compare primary data sources and secondary data sources (eg ABS Censusatschool [*www.abs.gov.au/****censusatschool***](http://www.abs.gov.au/censusatschool)). | **FOLIO 2: Correlation investigation**  **Students choose a theme to investigate and compare primary data sources and secondary data sources (eg ABS Censusatschool)** |
| 3-3 | 4.3  Linear Correlation | Folio 2 |

**Topic 5 – Investments and Loans (6 weeks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **week** | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 3-4 | 5.1  Lump-sum Investments | Investing: Terminology  Interest: Simple and Compound  Tax on interest earned  Inflation |  |
| 3-5 | 5.2  Annuity Investments | Investing: Annuities  Calculations: Future value, time (number of periods), interest rate, interest earned.  Assumptions over the long term, effects of, for example, a rate change, regular deposit increased, etc. |  |
| 3-6 | 5.2  Annuity Investments | Investing: Applications:   * Long-term investments * Superannuation * Effects of taxation and Inflation |  |
| 3-7 | 5.3  Loan Annuities | Loans: Terminology  Calculations: Present value, regular payment, interest rate, interest paid.  Assumptions over the long term, effects of, for example, a rate change, regular payment increased, etc. |  |
| 3-8 | 5.3  Loan Annuities | Loans: costs of borrowing  Charges on loan accounts  Comparison rates (no calculations required)  Interest minimisation strategies | **FOLIO 3: Car Purchase: Save Up/Borrow**  Students investigate using an unsecured loan to purchase a car. They examine ways to minimise interest, examine the validity of bank and online simulator, and compare with saving for the car. |
| 3-9 | 5.2, 5.3 | Folio 3: Students investigate an unsecured loan to purchase a car. They examine ways to minimise interest, and examine the validity of online simulators. |
| 3-10 |  | Revision |  |

**Revision**

|  |  |  |  |
| --- | --- | --- | --- |
| Term  week | **Subtopic** |  | **Assessment Task** |
| 4-1 |  | Revision |  |
| 4-2 |  | Revision |  |
| 4-3 |  | Swot Vac |  |
| 4-4 |  | Exam |  |

**NOTES AND COMMENTS**

Please note that this is a working document and may need flexibility to adapt to varying school commitments and requirements.

**SUGGESTED ALLOCATION OF TIME**Topic 1: Scales, Plans and Models (4 weeks)

Topic 2: Measurement (6 weeks)

Topic 3: Business Applications (6 weeks)

Topic 4: Statistics (6 weeks)

Topic 5: Investments and Loans (6 weeks)

**Final Assessment consists of three components**

School-based Assessment (70%)

* Assessment Type 1: Skills and Applications Tasks (30%)
* Assessment Type 2: Folio (40%)

External Assessment (30%)

* Assessment Type 3: Examination (30%).