**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 | 1.1Geometry | 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 | 1.2Scale | 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 | 3.1Planning a Business Premises3.2Costing 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 | 3.2Costing 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 3.3Business 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 | 2.1Linear 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 | 2.1Linear 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 | 2.2Area 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 | 2.2Area Measure | Calculation of surface area of cubes, prisms, pyramids, and spheresSimple composites of these. |  |
| 2-4 | 2.3Mass, Volume, and Capacity | Conversions: units of mass, volume, and capacityCalculations: volume of cubes, prisms, pyramids, cones, and spheresDensity: Units, e.g. g/cm3Calculations: Use density to determine volume or mass of a specified material. |  |
| 2-5 | 2.3Mass, Volume, and Capacity | Density: Units, e.g. g/cm3Calculations: 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)**

|  |  |  |  |
| --- | --- | --- | --- |
| Termweek | **Subtopic** | **Concepts and Content -** Discerning use of technology. Some course components are calculated without technology as appropriate. | **Assessment Task** |
| 2-6 | 4.1Sampling from Populations | Terminology Sampling methodsBias and errors |  |
| 2-7 | 4.2Analysis and Representation of Sets of Data | Measures of centre and spreadOutliersStem-and-leaf plots and Box-and-whisker diagrams | **SAT 4 – Statistics (4.1, 4.2)****Calculator permitted 1 A4 page notes** |
| 2-8 | 4.3Linear Correlation | Terminology: dependent and independent variablesScatterplots: Association strength, form, and direction; Effect of outliersCausality, ValidityDegree 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 | 4.3Linear Correlation | Applying least squares regression line: extrapolate and interpolate values (making predictions). |  |
| 3-2 | 4.3Linear 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 | 4.3Linear 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 | 5.1Lump-sum Investments | Investing: TerminologyInterest: Simple and CompoundTax on interest earnedInflation |  |
| 3-5 | 5.2 Annuity Investments | Investing: AnnuitiesCalculations: 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: TerminologyCalculations: 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 borrowingCharges on loan accountsComparison 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**

|  |  |  |  |
| --- | --- | --- | --- |
| Termweek | **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%).