Stage 2 Essential Mathematics Program 2

Topic 1: Scales, Plans, and Models, Topic 2: Measurement, Topic 3: Business Applications, Topic 4: Statistics,

Topic 5: Investments and Loans

|  | **Lesson 1 – Single Lesson** | **Lesson 2 – Single Lesson** | **Lesson 3 – Double Lesson** |
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| **Term One**  **Week 1** | **Course Overview and Expectations** | **TOPIC ONE: SCALES, PLANS, AND MODELS**  Review 2D shapes and their properties including vertices and edges.  (square, rectangle, rhombus, parallelogram, trapezium, circle, triangles, and polygons) | Review 3D shapes and their properties including faces, vertices and edges.  (cube, sphere, prisms, pyramids, cylinder and cones) |
| **Week 2** | Recognising 3D shapes from 2D representations  Net 🡪 3D solid | Creating Scaled Diagrams   * Taking measurements within school to construct a scaled diagram | Creating Scaled Diagrams   * Commonly used symbols, labelling * What are appropriate scales to use * Accuracy of measurements and the effect of errors |
| **Week 3** | Reading and Interpreting Scaled Diagrams   * Finding lengths, perimeters and area * Can scaled diagrams tell us everything, e.g. steepness of hills * Accuracy of measurements and the effect of errors on calculations | Reading and Interpreting Scaled Diagrams   * Finding lengths, perimeters and area * Can scaled diagrams tell us everything, e.g. steepness of hills * Accuracy of measurements and the effect of errors on calculations | Using bearings to solve problems |
| **Week 4** | REVISION | **SCALES, PLANS AND MODELS – SAT ONE**  **30 minutes Non Calculator**  **20 minutes Calculator** | **TOPIC TWO: MEASUREMENT**  Review:   * Linear measurement units * Conversion between units km, m, cm, and mm * Conversion between metric and imperial * Perimeter of polygons, triangles, squares, and rectangles * Calculating circumference of circles and perimeter of arcs |
| **Week 5** | Given perimeter rearrange formula to find unknown lengths (e.g. Find the radius of a circle given the circumference) | Perimeter of composite shapes | Finding missing sides of right-angled triangles   * Using Pythagoras Theorem   (Including questions involving angle of elevation/depression) |
| **Week 6** | Finding missing sides of right-angled triangles   * Using sine, cosine and tangent ratios   (Including questions involving angle of elevation/depression) | Finding missing sides of right-angled triangles   * Using sine, cosine and tangent ratios   (Including questions involving angle of elevation/depression) | Finding missing sides of non-right-angled triangles using sine rule |
| **Week 7** | Finding missing sides of non-right-angled triangles using cosine rule | Finding missing sides of non-right-angled triangles using cosine rule | What are the appropriate units for area and how do we convert between them.?  (including hectare and acres)  Areas of regular shapes  (triangles, squares, rectangles, parallelograms, trapeziums, circles, and sectors) |
| **Week 8** | Areas of composite shapes | Areas of composite shapes | Area of irregular shapes   * Using simple shapes * Simpson’s rule |
| **Week 9** | Calculating surface area of cubes, rectangular and triangular based prisms, pyramids, cylinders and spheres | Calculating surface area of cubes, rectangular and triangular based prisms, pyramids, cylinders and spheres | Calculating surface area simple composite 3D shapes |

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| **Week 10** | **FOLIO ONE** | Converting metric units of mass  The connection between volume and capacity and conversion between them (e.g. 1cm3= 1mL and 1m3=1kL)  The connection between volume and mass   * Units of measurement for density * Calculating density | Calculating the volume of cubes, rectangular and triangular prisms, pyramids, cones, cylinders, and spheres |
| **Week 11** | REVISION | **MEASUREMENT – SAT TWO** | **FOLIO ONE: Scales, Plans and Models and Measurement** |
| Term Two  **Week 1** | **TOPIC THREE: BUSINESS APPLICATIONS**  Factors that affect location of a business  Calculating the cost of business premises | Introduction to the pricing of goods to be sold and key terms – manufacturer’s cost, wholesaler’s cost, retail cost, profit margin, discount, GST, and input tax credits. | Trade discount, series discount |
| **Week 2** | GST  (The whole process from manufacturer to retailer) | GST  (The whole process from manufacturer to retailer) | Calculating selling price given profit margins |
| **Week 3** | Depreciation methods   * Straight-line method | Depreciation methods   * Reducing balance depreciation | Depreciation graphs |
| **Week 4** | Discussion of other business costs e.g. insurance, WorkCover, public liability, and their importance. | Input tax credit calculations | Fixed and variable costs |
| **Week 5** | Break-even point   * Graphically | Break-even point   * Marginal income | Profit-and-loss statements and profit projections by hand and via Excel |
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| **Week 6** | Introduction to business structures and tax advantages for different types:   * Sole trader * Partnership * Company | Tax calculations for sole trader and partnership business structures. | Tax calculations for sole trader and partnership business structures.  REVISION |
| **Week 7** | **BUSINESS APPLICATIONS –**  **SAT THREE** | **TOPIC FOUR: STATISTICS**  Understanding the key terms of sampling and why we sample.  Census, Population, Sample, Survey | Sampling methods and their advantages and disadvantages:   * Simple random * Stratified * Systematic * Self-selected |
| **Week 8** | Sample size and its impact on reliability | Bias in sampling (faults and errors)   * Sampling errors * Measurement errors * Coverage errors * Non-response errors | Calculation of measures of central tendency and spread.   * Mean * Median * Range |
| **Week 9** | MID YEAR EXAMS | | |
| **Week 10** | Calculation of measures of central tendency and spread.   * Interquartile range * Standard Deviation | Outliers and the effect on distributions |  |

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| Term Three  **Week 1** | Review Stem-and-leaf plots | Review Box-and-whisker diagrams | Graphing linear relationships to see if there is a connection between two variables   * Independent and dependent variables * How to draw scatter plots * Patterns and features of scatter plots * Description of association (direction, form, and strength) * Causality |
| **Week 2** | Pearson’s correlation coefficient | When do we create a line of best fit:   * Coefficient of determination * Least squares regression line | When do we create a line of best fit:   * Coefficient of determination * Least squares regression line |
| **Week 3** | Using the line of best fit to interpolate and extrapolate. | Outliers effect on linear relationship. | **FOLIO 2: Statistics** |
| **Week 4** | **TOPIC FIVE: INVESTMENTS AND LOANS**  Review investing money via simple interest investments  (focus on rearranging formula) | Review investing money via compound interest investments | What impacts earnings of investments?   * Inflation * Taxation |

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| **Week 5** | Introduction to future-value annuities  Future-value annuity calculations:   * Future values * Regular deposit * Number of periods * Interest rate * Interest earned   (Including assumptions made in these calculations) | Future-value annuity calculations:   * Future values * Regular deposit * Number of periods * Interest rate * Interest earned   (Including assumptions made in these calculations) | Future-value annuity calculations:   * Future values * Regular deposit * Number of periods * Interest rate * Interest earned   (Including assumptions made in these calculations) |
| **Week 6** | Applications of Annuities   * Long-term investments * Superannuation | Applications of Annuities   * Long-term investments * Superannuation | Impact on investment   * Taxation * Inflation |
| **Week 7** | Introduction to present-value annuities  Cost of a loan calculations:   * Present value * Regular payment * Number of periods * Interest rate * Interest paid   (Including assumptions made in these calculations) | Cost of a loan calculations:   * Present value * Regular payment * Number of periods * Interest rate * Interest paid   (Including assumptions made in these calculations) | Cost of a loan calculations:   * Present value * Regular payment * Number of periods * Interest rate * Interest paid   (Including assumptions made in these calculations) |
| **Week 8** | What is the best loan option?   * Charges on loan * Comparison rates (no calculations) | What is the best loan option?   * Charges on loan * Comparison rates (no calculations) |  |

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| **Week 9** | REVISION | **INVESTMENT AND LOANS**  **– SAT FOUR** |  |
| **Week 10** | EXAM REVISION | EXAM REVISION | EXAM REVISION |
| Term Four  **Week 1** | EXAM REVISION | EXAM REVISION | EXAM REVISION |
| **Week 2** | EXAM REVISION | EXAM REVISION | EXAM REVISION |
| **Week 3** | **SWAT VAC – NO CLASSES** | | |
| **Week 4** | **EXAMINATIONS START** | | |
| **Week 5** |