**IGNITE RICH Maths [ <http://blogs.crusoecollege.vic.edu.au/maths> ]**

**Semester 2**

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| **Term 3** | | | | | | | |
|  | **Level E** | **Level F** | **Level G** | **Level H** | **Level I** | **Level J** | **Level K** |
| **Introducing Algebra** | ***Matchstick Maths***  Find the rule for eight matchstick patterns. | ***Number Stories***  Eight number stories – 2 about addition, 2 about multiplication, 2 about subtraction and 2 about division. Solve using inverse operations. | ***Number stories with brackets***  Four one-step number stories and four two step number stories. Solve using inverse operations. | ***Algebra number stories***  Four one-step number stories and four two step number stories. Express using algebra and solve using inverse operations. | **Covers *Algebra***  Play the game then create your own version. | ***Algebra Dominoes***  Complete the four doughnuts and prove each matching domino. | ***Backyard Blitz***  Design 5 backyards with factorised equation, quadratic equation and diagram. Include a sample area calculation for each. |
| **Algebra Patterns** | ***Number stories***  Eight number stories – 2 about addition, 2 about multiplication, 2 about subtraction and 2 about division. Solve using inverse operations. | ***”Straights” Game***  Find 10 straights and identify the pattern for each. | ***”Straights” Game with rules***  Find 10 straights and identify the pattern and rule for each. | ***Reverse number stories***  Use the formulas given to create a table and then a story to match the table and formula. | ***Algebra Dominoes***  Complete the four doughnuts and prove each matching domino. | ***Factorising Game***  Play the factorising game, and for each counter placed, express the algebraic term as two factors using rectangles. Minimum 6 factorised terms. | ***Covers Quadratics***  Play the quadratics game, and for each token placed, prove that the two quadratics are equal. Minimum 10 proofs. When finished, make your own game. |
| **Lines and coordinates** | ***Pirate Maps***  Create a pirate map with 6 places of interest. Describe the position of each with scale and compass directions | ***Pirate Maps***  Use the map created for level E. Design a tour of all the places, using scale, compass directions and grid references | ***Cops ‘n’ Robbers***  Plot the points and write the coordinates for five games, with explanations for each move | ***Café Tables***  Draw up a graph, table and find the rule for three different shaped café tables. | ***Number Plumber***  Use number plumber to create 10 linear equations. Include the equation, table and graph for each. Include 2 with positive gradient, 2 with negative gradient, 2 with negative x intercept and 2 with positive x intercept | ***Mobile Plumber***  Analyse 8 phone company plans. For each, find the base cost, rate per hour and draw a graph. | ***Truck Plumber***  Use number plumber and algebra to find the cheapest rental truck |
| **Interpreting graphs** |  | ***More Pirate*** ***Maps***  Take the pirate map made in the previous topic and expand it to twice the size |  | ***Trip to Melbourne***  Graph Jill’s trip to Melbourne and write a story that describes the graph. Create two time graphs of your own and write stories for them. | ***Hidden Plumbing***  Find the rule from a graph and table of eight unknown linear relationships. Record the table, graph and rule. | ***Line segment game***  Play the line segment game, and show the calculation of finding the midpoint of four lines from your game, and the distance of four lines from the game. | ***Geometry of fonts***  Find the coordinates and gradients of the letters A and K before choosing your own letters to represent using linear and non-linear equations. One should include two lines that are parallel and two that are perpendicular – how do their gradients relate? |

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| **Term 4** | | | | | | | |
|  | **Level E** | **Level F** | **Level G** | **Level H** | **Level I** | **Level J** | **Level K** |
| **Transformations** | ***Battleships***  Design as many battleships as you can that are symmetrical from a 9x9 grid. Ships can have 3, 4, 5 or 6 shaded squares within the grid | ***Battleships***  Then organise 3 symmetrical and 3 non-symmetrical ships in one quadrant of the game grid. In the other quadrants, translate, rotate and reflect ships | ***Battleships***  As per level F, except in each quadrant you must perform two operations to each ship (reflect and rotate, reflect and translate, rotate and translate) | ***Battleships***  In part one, rotate each of the six ships through 90, 180 and 270 degrees. In part two, reflect about the X-axis, the Y-axis and then both axes. Describe rotations and reflections using Cartesian coordinates | ***Straw Triangles***  Prove the conditions needed for congruent triangles using straws. Four straw models needed. | ***Non-linear plumber***  Plot the graphs, record the equations and identify the features of four non-linear equations | ***Inequalities***  Choose coordinates for your battleship and use inequalities to plot your opponent’s destruction |
| **Data** | ***Graphing a survey***  conduct a categorical survey and graph the results electronically |  | ***Data project***  write a glossary of terms used in the analysis of data; use flash cards to collect data about fictional students; and present some of the data in a frequency table and side-by-side bar graph | ***Data project***  as per level G, but you must also show they can count median, mode, mean and range and construct a dot plot and histogram of a selection of the data | ***Census@School sample size***  Part 1- analyse small samples of students and answer questions on the variation of the samples using calculations of mean, median, mode and range.  Part 2 – repeat part 1 with a larger sample size  Part 3 – repeat part 1 with your own measurements in class | ***Census@School data shapes***  Construct back-to-back stem and leaf plots and histograms of data from the Census@School website, and comment on the shape of the histograms | ***Census@School box and whisker***  2 parts: 2013 analysis (dot plot, histogram, box plot, and paragraph explaining differences in plots); and 2013 to previous year comparison (2 box plots and a paragraph explaining what the box plots tell you about how the variable has changed over time) |
| **Angles** | ***Golf Course Angles***  1 golf course hole with four angles: one a right angle, one an obtuse angle, and one an acute angle | ***Golf Course Angles***  1 golf course hole: four sides, one angle 60°, one angle 110°, the other two measured | ***Golf Course Angles***  Same as level F with four angles calculated around each point | ***Golf Course Angles***  **Part 1:** Create rhombus, kite, parallelogram and trapezium shapes. Divide into 2 triangles. Measure the angles of each triangle and add up. Repeat for Quadrilateral. **Part 2:** Use holes created in part 1 and make a bridge from two parallel lines with a stream underneath. Show complementary, corresponding and supplementary angles | ***Golf Course Angles***  Use the holes created in level H or create new holes: kite, trapezium, parallelogram and rhombus. Divide each quadrilateral into two. Use rules for congruence to decide if the triangles that form the quadrilaterals are congruence. Use a different rule for each quadrilateral (SSS, SSA, ASA, student’s choice for the 4th shape). | ***Golf Course Angles***  Create a scalene triangle golf hole. Create a similar triangle that is 1.5 times bigger. Create a third similar triangle where the longest side is 20cm. | ***Golf Course Angles***  **Part** **1** – Create four holes (kite, rhombus, parallelogram and trapezium). Prove congruence of triangles in each shape. Prove the minimum number of angles and side lengths that need to be determined.  **Part 2** – Enlarge one quadrilateral by a scale factor of 1.5. Enlarge a different quadrilateral so that the hypotenuse of the two triangles is 19cm long. |
| **Shapes** |  |  |  | ***4 cubed house***  Identify all the houses that can made from four cubes. Draw on isometric paper, and show front, side and top views. Calculate cost of each house and design brochures. | ***Prisms***  Drawings of nets of 5 prisms with measurements and calculations of volume. Design a prism of your own with a net, measurements and volume. Describe how the design fits the purpose. | ***Pythagoras and Trigonometry***  One proof of Pythagoras’ theorem  Sheets that shows the derivation of sine, cosine and tangent |  |