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**Knowledge Rich Curriculum Plan**

Year 10 Foundation + – Algebra 3



| **Lesson Objective** | **Intended Knowledge:**  *Students will know that…* | **Tiered Vocabulary** | **Prior Knowledge:**  *In order to know this, students need to already know that…* | **Assessment** |
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| **To learn how to find the nth term of a linear sequence** | * Students will know how to generate linear sequences using the nth term. * Students will know how to find the nth term of a linear sequence. * Students will know how to find the nth term of a pattern sequence. * Students will know how to solve problems involving sequences from real life situations. | **Sequence** - a particular order in which related things follow each other.  **Generate –** produce or create.  **Linear or Arithmetic Sequence** - A number pattern which increases (or decreases) by the same amount each time  **Geometric Sequence –** a sequence made by multiplying by the same value each time  **Nth Term –** a formula that enables us to find any term in a sequence. The ' n ' stands for the term number | * Students will need to know how to continue sequences including patterns and quadratic sequence * Students will need to know how to describe the term-to-term rule for a sequence |  |
| **To learn how to solve problems using the nth term of a linear sequence** | * Students will know how to generate both linear and quadratic sequences using the nth term. * Students will know how to use the nth term of an arithmetic sequence to decide if a given number is a term in the sequence. * Students will know how to solve problems involving sequences from real life situations * Students will know how to find the first term greater/less than a certain number | **Quadratic –** involving a squared algebraic term but no other power higher than 2  **Substitute –** use or add in place of | * Students will need to know how to substitute positive and negative numbers into formulae |  |
| **To learn how to draw straight line graphs** | * Students will need to know how to plot and draw graphs of y = a, x = a, y = x and y = –x, drawing and recognising lines parallel to axes. * Students will know how to draw y = x and y = -x * Students will know how to complete a table of values and plot graphs in the form y = mx + c Students will know how to plot graphs in the form y = mx + c * Students will know how to draw straight line graphs in the form y = mx + c by using a table of values. * Students will know how to plot straight line graphs in the form y = mx + c by first constructing their own table of values * Students will know how to plot and draw graphs of straight lines in the form x + y = c | **Intercept** – cross  **Y-intercept** – the y-intercept tells us where a graph crosses the y-axis, this where x = 0  **X-intercept** – the x-intercept tells us where a graph crosses the x-axis, this where y = 0  **Substitute –** use or add in place of  **Coordinate –** two numbers or sometimes a letter and a number, that locate a specific point on a grid. They are written in the form (x, y) most commonly.  **Vertical –** something that is vertical stands or points straight up  **Horizontal –** something that is arranged sideways, parallel to the horizon, like a person lying down  **Quadrant –** one of the four quarters of the coordinate plane | * Students will need to know how to plot coordinates * Students will need to know how to substitute into formulae |  |
| **To learn how to interpret the equation of a straight line and calculate the gradient.** | * Students will know how to identify the gradient and y-intercept of a straight line given the equation. |  | * Students can identify coordinates of given points in the first quadrant or all four quadrants. |  |
| **To learn how to find the equation of a straight line** | * Students will know how to identify the gradient and y-intercept of a straight line given the equation. * Students will know that * Students will know that the equation of a straight line can be written in the form y = mx + c where m tells us the gradient of the line and c tells us the y-intercept * Students will know how to find the equation of a given straight line | **Intercept** – cross  **Y-intercept** – the y-intercept tells us where a graph crosses the y-axis, this where x = 0  **X-intercept** – the x-intercept tells us where a graph crosses the x-axis, this where y = 0  **Gradient** – steepness. The gradient of a line tells us how steep the line is. | * Students need to know how to write coordinates |  |
| **To learn how to find the equation of a line and of parallel lines** | * Students will know how to substitute values into the equation of the line to find the intercept. * Students will know how to select and use the fact that when y = mx + c is the equation of a straight line, then the gradient of a line parallel to it will have a gradient of m. * Students will know how to generate equations of lines parallel to the given line. * Students will know how to identify parallel lines from their equations. Students will know that parallel means that two lines side by side will never meet. * Students will know how to determine the equation of a straight line from two pairs of coordinates. | **Parallel –** parallel lines are two lines that are side by side and have the same distance continuously between them. | * Students will need to know how to solve linear equations * Students will need to know how to calculate gradient between two coordinates |  |
| **To learn how to solve linear simultaneous equations graphically** | * Students will know how to use linear graphs to estimate values of y for given values of x and vice versa. * Students will know how to solve linear simultaneous equations graphically | **Simultaneous –** occurring, operating, or done at the same time.  **Simultaneous equations –** equations involving two or more unknowns that are to have the same values in each equation.  **Linear Equation –** an equation between two variables that can be written in the form y = mx + c. Linear equations give a straight line when plotted on a graph. | * Students will need to know how to draw straight line graphs |  |
| **To learn how to solve linear simultaneous equations** | * Students will use elimination to solve basic linear simultaneous equations algebraically |  | * Students need to know how to solve linear equations * Students need to know how to substitute numbers into formulae |  |
| **To learn how to solve linear simultaneous equations** | * Students will know how to use elimination to solve linear simultaneous equations algebraically including where both need multiplying. * Students will know how to form and solve linear simultaneous equations. |  |  |  |
| **To learn how to draw quadratic graphs** | * Students will know how to recognise graphs of quadratic functions * Students will know how to generate points and plot graphs of quadratic functions with a calculator | **Quadratic –** An expression or equation where the highest power is 2.  **Parabola –** the U or ∩ shape of a quadratic graph | * Students will know how to substitute positive and negative integers into formulae involving squared terms |  |
| **To learn how to draw and interpret quadratic graphs** | * Students will know how to identify the line of symmetry of a quadratic graph * Students will know how to find approximate and exact solutions to quadratic equations by identifying the roots of a graph * Students will know how to solve quadratics in the form ax2 + bx + c = d by drawing the graph of y = d and reading off the values for x * Students will know how to identify the turning point for a drawn quadratic graph | **Turning Point** – The point at which the gradient changes of a curve (the maximum or minimum point on a curve).  **Root** – A solution to an equation where a line or curve crosses the x-axis. | * Students will know how to generate points and plot graphs of quadratic functions |  |
| **To learn how to solve quadratics by factorising** | * Students will know how to solve quadratic equations by factorising where the coefficient of x2 is 1. | **Solve –** find an answer  **Equation –** A mathematical statement that two amounts, or groups of symbols representing an amount  **Factorise –** put back into brackets by bringing common factors outside  **Quadratic Equation –** an equationinvolving a squared algebraic term but no other power higher than 2 | * Students will need to know how to factorise quadratic equations where the coefficient of x2 is 1. |  |
| **To learn how to recognise and draw quadratic, cubic and reciprocal graphs** | * Students will know how to recognise and sketch simple cubic functions. * Students will know how to recognise and sketch graphs of the reciprocal function y=1/x with x ≠ 0 * Students will know how to recognise and sketch graphs of exponential functions. * Students will know how to complete a table of values and plot reciprocal graphs with and without a calculator. * Students will know how to complete a table of values and plot a cubic function. * Students will know how to interpret graphs of simple cubic functions, including finding solutions to cubic equations. * Students will know how to recognise the shape of different graphs and match equations to sketches. | **Cubic –** Of the third power, order, or degree. In maths a cubic function is one involving a cubed algebraic term but no other power higher than 3.  **Reciprocal –** The reciprocal of a number is: 1 divided by the number  **Exponential –** a relation of the form y = ax  **Function –** a relation or expression involving one or more variables | * Students will know how to substitute positive and negative numbers into formulae from mathematics. * Students will know how to plot coordinates in all four quadrants. |  |