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**Knowledge Rich Curriculum Plan**

Year 10 Higher+ Algebra 3

| **Lesson/Learning Sequence**  | **Intended Knowledge:***Students will know that…* | **Tiered Vocabulary**  | **Prior Knowledge:***In order to know this…* | **Assessment**  |
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| **To learn how to find the nth term of a quadratic sequence** | * Students will know how to continue a quadratic sequence and use the nth term to generate terms
* Students will know how to find the nth term of a quadratic sequence.
* Students will know how to solve problems involving the nth term of quadratic sequences
 | **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**Quadratic –** An expression or equation where the highest power is 2.**Substitute –** use or add in place of | * Students will need to know how to find the nth term of a linear sequence
* Students will need to know how to generate a sequence for a given nth term, including those in the form an2
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| **To learn how to draw and interpret quadratic graphs** | * Students will know how to draw quadratic graphs without a calculator
* Students will know how to identify the coordinates of the turning point for a quadratic graph they have drawn
* Students will know how to identify the roots for a quadratic graph that they have drawn
* Students will know that the shape of a quadratic graph is called a parabola
* Students will know how to find approximate and exact solutions to quadratic equations in the form ax2 + bx + c = d where d is an integer or decimal number by drawing a suitable horizontal straight line
* Students will know how to identify the line of symmetry of a quadratic graph
 | **Quadratic –** An expression or equation where the highest power is 2.**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. **Parabola –** the U or ∩ shape of a quadratic graph | * Students will need to know how to substitute both positive and negative numbers into expressions involving squaring
* Students will need to know how to draw graphs in the form y = a, x = a
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| **To learn how to draw and recognise quadratic, cubic and reciprocal graphs** | * Students will know how to recognise and draw cubic functions.
* Students will know how to recognise and draw graphs of reciprocal functions
* Students will know how to recognise and sketch graphs of exponential functions.
* Students will know how to complete a table of values and plot a cubic function.
* 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 | * Students will need to know how to substitute numbers into formulae involving cubes and fractions
* Students will need to know how to convert a fraction to a decimal
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| **To learn how to find turning points by completing the square** | * Students will know that we can find the turning point of a quadratic by writing it in the form (x ± a)2 ± b
* Students will know that the coordinates of the turning point of a quadratic written in the form (x + a)2 + b is (-a, b)
 | **Turning Point** – The point at which the gradient changes of a curve (the maximum or minimum point on a curve).  | * Students need to know how to expand and simplify a squared bracket
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| **To learn how to factorise and solve quadratics** | * Students will know how to factorise and solve quadratic equations in the form ax2 + bx + c = 0
* Students will know that in order to factorise and solve quadratic equations they must be equal to zero.
* Students will know how to rearrange equations to make them equal to zero before factorising and solving them
* Students will know how to form and solve quadratic equations where the coefficient of x2 is 1
 | **Factorise –** put back into brackets by bringing common factors outside**Quadratic –** involving a squared algebraic term but no other power higher than 2 | * Students need to be able to factorise quadratics
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| **To learn how to solve quadratics using the quadratic formula** | * Students will know that the quadratic formula is $x=\frac{-b\pm \sqrt{b^{2}-4ac}}{2a}$
* Students will know that we use the quadratic formula when a quadratic cannot be factorised
* Students will know how to identify the values for a, b and c from a quadratic equation including where the equation is not necessarily in the order ax2 + bx + c
* Students will know how to substitute the values for a, b and c into the quadratic formula to solve the corresponding quadratic equation
* Students will know that in order to solve quadratic equations they must be equal to zero.
* Students will know how to rearrange equations to make them equal to zero before using the quadratic formula to solve them
* Students will know how to form and solve quadratic equations using the quadratic formula
 | **Formula –** A mathematical relationship or rule expressed in symbols.  | * Students need to be able to use a calculator efficiently
* Students need to be able to substitute numbers into formulae
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| **To learn how to form and solve quadratic equations** | * Students will know how to form and solve quadratic equations involving shape using either the quadratic formula or factorisation
 |  | * Students will need to know how to solve quadratic equations
* Students will need to know how to form and solve linear equations
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| **To learn how to solve quadratic inequalities** | * Students will know how to solve quadratic inequalities
 | **Quadratic –** involving a squared algebraic term but no other power higher than 2**Inequality –** a symbol which makes a non-equal comparison between two numbers or other mathematical expressions e.g. >, <, > and < | * Students will need to know how to solve quadratic equations
* Students will need to know how to sketch quadratics showing the roots
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| **To learn how to solve quadratic simultaneous equations graphically** | * Students will know how to solve quadratic simultaneous equations by identifying the points of intersection between a straight line and a curve
* Students will know how to solve quadratic simultaneous equations by drawing the curve and the straight line and identifying the points of intersection
* Students will know how to solve a different quadratic equation to that drawn by deriving and drawing a suitable straight line on a quadratic graph
 | **Quadratic –** involving a squared algebraic term but no other power higher than 2**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 quadratic graphs
* Students will need to know how to draw straight line graphs
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| **To learn how to solve quadratic simultaneous equations** | * Students will know how to solve quadratic simultaneous equations algebraically using substitution.
 |  | * Students will need to know how to solve linear simultaneous equations algebraically
* Students will need to know how to solve quadratic equations
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| **To consolidate my understanding of solving quadratic simultaneous equations** | * Students will know how to solve quadratic simultaneous equations algebraically using substitution.
 |  | * Students will need to know how to solve quadratic simultaneous equations
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