Knowledge Rich Curriculum Plan

Year 9 Prime - Sequences and Graphs

| Lesson Objective | Intended Knowledge: <br> Students will know that.. | Tiered Vocabulary | Prior Knowledge: <br> In order to know this, students need to already know that... | Assessment |
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| To learn how to generate a sequence from the $n$th term and find the nth term for a sequence | - Students will know how to generate a linear sequence using the nth term <br> - Students will know how to generate a quadratic sequence from its nth term <br> - Students will understand the relationship between the nth term of a sequence and the terms in a sequence, for example a ' $2 n$ ' sequence goes up in 2 s etc <br> - Students will know how to find the nth term of a linear sequence <br> - Students will know how to find the nth term of a pattern sequence. <br> - Students will know how to identify whether a term can be in a sequence given its nth term by forming and solving a linear equation <br> - Students will know how to find and use the nth term to determine whether a number will be in a linear sequence | Sequence - a particular order in which related things follow each other. <br> Linear or Arithmetic Sequence - a number pattern which increases (or decreases) by the same amount each time <br> Geometric Sequence - a sequence made by multiplying by the same value each time <br> Generate - produce or create. <br> Substitute - use or add in place of <br> 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 solve linear equations | Mini-Assessment 4 |
| To learn how to draw straight line graphs | - Students will know how to plot straight line graphs in the form $\mathrm{y}=\mathrm{mx}+\mathrm{c}$ by first completing a given table of values <br> - Students will know how to plot straight line graphs in the form $y=m x+c$ by constructing their own table of values <br> - Students will know how to plot and draw graphs of straight lines in the form $x+y=c$ <br> Opportunity for Challenge: <br> - Students will know how to plot and draw graphs of straight lines in the form $a x+b y=$ c | Substitute - use or add in place of Quadrant - one of the four quarters of the coordinate plane | - Students should already know how to plot and draw graphs that are parallel to either the $x$ - or $y$-axis (equations in the form $y=a$, $x=a$ ) | Mini-Assessment 4 |
| 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. <br> - Students will know how to calculate gradient between two pairs of coordinates. <br> - Students will know that gradient $=\frac{\text { change in } y}{\text { change in } x}$ <br> - Students will know that the equation of a straight line can be written in the form $y=m x$ $+c$ where $m$ tells us the gradient of the line and $c$ tells us the $y$-intercept. <br> - Students will know how to find the equation of a given straight line. | Intercept - cross <br> Y-intercept - the y-intercept tells us where a graph crosses the $y$-axis, this where $x=0$ <br> X-intercept - the x -intercept tells us where a graph crosses the $x$-axis, this where $y=0$ <br> Gradient - steepness. The gradient of a line tells us how steep the line is. | - Students need to know how to write coordinates | Mini-Assessment 4 |
| To learn how to find the equation of a straight line | - Students will know how to find the equation of a straight line given the gradient and a coordinate in the form ( $x, y$ ) where the $x$-coordinate is 0 <br> - Students will know how to find the equation of a straight line given the gradient and a coordinate in the form ( $\mathrm{x}, \mathrm{y}$ ) where x and y take any integer values <br> - Students will know how to find the equation of a line between two pairs of coordinates by first calculating the gradient between the two points |  | - Students will need to know how to calculate gradient <br> - Students will need to know how to substitute numbers into formulae | Mini-Assessment 4 |
| To learn how to find the equation of parallel lines | - Students will know that parallel lines have the same gradient <br> - Students will know how to find the equation of any straight line that is parallel to another given line <br> - Students will know how to find the equation of a particular straight line that is parallel to another given line and passes through a certain coordinate <br> Opportunity for Challenge: | 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 calculate gradient <br> - Students will need to know how to solve linear equations in the form $\mathrm{a}+\mathrm{x}=\mathrm{c}$ where $a$ and $c$ are integers or fractions | Mini-Assessment 4 |


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|  | - Students will know how to solve more complex problems involving finding the equation of parallel lines |  |  |  |
| To learn how to solve linear simultaneous equations | - Students will know how to solve linear simultaneous equations or find estimates to their solutions given two straight lines drawn on a graph <br> - Students will know how to draw two straight lines to identify the point of intersection to solve two simultaneous equations <br> - Students will know how to use elimination to solve linear simultaneous equations algebraically | Intersection - a point at which two or more things cross <br> Simultaneous - occurring, operating, or done at the same time. <br> Simultaneous equations - equations involving two or more unknowns that are to have the same values in each equation. <br> Linear Equation - an equation between two variables that can be written in the form $\mathrm{y}=\mathrm{mx}+\mathrm{c}$. Linear equations give a straight line when plotted on a graph. | - Students will need to know how to calculate with negatives | Mini-Assessment 4 |
| To learn how to solve linear simultaneous equations | - Students will know how to use elimination to solve linear simultaneous equations algebraically <br> - Students will know how to solve linear simultaneous equations representing a real-life situation and interpret the solution in the context of the problem |  | - Students will need to know how to solve linear equations | Mini-Assessment 4 |
| To learn how to draw quadratic graphs | - Students will know how to generate points for a simple quadratic graph without a calculator <br> - Students will know how to use a calculator to generate points for a quadratic graph in the form $y=a x^{2}+b x+c$ where $a=1$ and $b$ and $c$ are any integer including 0 <br> - Students will know how to plot a quadratic graph once they have generated the points <br> - Students will know that the points for a quadratic graph should be joined with a smooth curve <br> - Students will know how to use a calculator to generate points for a quadratic graph in the form $y=a x^{2}+b x+c$ where $a \neq 1$ and $b$ and $c$ are any integer including 0 | Quadratic - An expression or equation where the highest power is 2 . <br> Parabola - the $U$ or $\cap$ shape of a quadratic graph | - Students will need to know how to calculate with negative numbers without a calculator <br> - Students will need to know how to square negative numbers without a calculator <br> - Students will need to know how to substitute both positive and negative integers into formulae without a calculator | Mini-Assessment 4 |
| To learn how to draw quadratic graphs and find roots and turning points | - Students will know how to recognise graphs of quadratic functions. <br> - Students will know how to generate points and plot graphs for quadratic functions, with and without a calculator. <br> - Students will know how to identify the line of symmetry of a quadratic graph <br> - Students will know how to find approximate and exact solutions to quadratic equations by identifying the roots of a graph <br> - Students will know how to identify the turning point for a drawn quadratic graph. Opportunity for Challenge: <br> - Students will know how to find approximate and exact solutions to quadratic equations in the form $a x^{2}+b x+c=d$ where $d$ is an integer or decimal number by drawing a suitable horizontal straight line | Quadratic - An expression or equation where the highest power is 2 . <br> Symmetry - A shape or object has symmetry if it can be divided into 2 or more identical pieces. Turning Point - The point at which the gradient changes of a curve (the maximum or minimum point on a curve). <br> Root - A solution to an equation where a line or curve crosses the $x$-axis. <br> Parabola - the $U$ or $\cap$ shape of a quadratic graph | - Students will need to know how to substitute both positive and negative numbers into equations involving squared terms | Mini-Assessment 4 |


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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 $a x^{2}+b x+c=0$ where $a=1$ <br> - Students will know that in order to factorise and solve quadratic equations they must be equal to zero. <br> - Students will know how to rearrange equations to make them equal to zero before factorising and solving them <br> Opportunity for Challenge: <br> - Students will know how to form and solve quadratic equations where the coefficient of $x^{2}$ is 1 | Factorise - put back into brackets by bringing common factors outside <br> Quadratic - involving a squared algebraic term but no other power higher than 2 | - Students need to be able to factorise quadratics where the co-efficient of $x^{2}$ is 1 | Mini-Assessment 4 |
| To learn how to solve quadratic equations using the quadratic formula | - Students will know that the quadratic formula is $x=\frac{-b \pm \sqrt{b^{2}-4 a c}}{2 a}$ <br> - Students will know that we use the quadratic formula when a quadratic cannot be factorised <br> - 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 $a x^{2}+b x+c$ <br> - Students will know how to substitute the values for $\mathrm{a}, \mathrm{b}$ and c into the quadratic formula to solve the corresponding quadratic equation <br> - Students will know that in order to solve quadratic equations they must be equal to zero. <br> - Students will know how to rearrange equations to make them equal to zero before using the quadratic formula to solve them <br> Opportunity for Challenge: <br> - 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 <br> - Students need to be able to substitute numbers into formulae | Mini-Assessment 4 |

