



The Sutton Academy

# Knowledge Rich Curriculum Plan

Year 9 Support – Sequences and Graphs

Lesson Objective	Intended Knowledge: <i>Students will know that...</i>	Tiered Vocabulary	Prior Knowledge: <i>In order to know this, students need to already know that...</i>	Assessment
<p><b>To learn how to continue sequences of diagrams and numbers and identify and use the term-to-term rule</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to find the next terms in pattern sequences</li> <li>• Students will know how to continue linear sequences to find subsequent terms</li> <li>• Students will know how to continue geometric sequences to find subsequent terms</li> <li>• Students will know how to continue other simple sequences</li> <li>• Students will know how to identify the term to term rule for an arithmetic sequence</li> <li>• Students will know how to identify the term to term rule for a geometric sequence</li> <li>• Students will understand the difference between arithmetic and geometric sequences</li> <li>• Students will know how to use ascending/descending to describe sequences.</li> <li>• Students will know that triangular numbers are numbers that make a triangular dot pattern. E.g. 1,3,6,10,15</li> <li>• Students will know how to recognise and continue Fibonacci sequences</li> <li>• Students will know how to continue a quadratic sequence</li> <li>• Students will know how to find missing terms in a sequence given the term-to-term rule</li> <li>• Students will know how to find missing terms within a sequence by first finding the term-to-term rule</li> </ul>	<p><b>Sequence</b> - a particular order in which related things follow each other.</p> <p><b>Ascending</b> – going up</p> <p><b>Descending</b> – going down</p> <p><b>Linear or Arithmetic Sequence</b> – a number pattern which increases (or decreases) by the same amount each time</p> <p><b>Geometric Sequence</b> – a sequence made by multiplying by the same value each time</p> <p><b>Fibonacci Sequence</b> – a sequence of numbers in which each number is the sum of the two preceding numbers. The simplest is the series 1, 1, 2, 3, 5, 8, etc.</p> <p><b>Triangular Numbers</b> – any of the series of numbers (1, 3, 6, 10, 15, etc.) obtained by continued adding of the natural numbers 1, 2, 3, 4, 5, etc.</p> <p><b>Quadratic</b> – involving a squared algebraic term but no other power higher than 2</p>	<ul style="list-style-type: none"> <li>• Students should already know how to continue a numerical, linear sequence and a pattern sequence</li> <li>• Students should already know how to identify the term-to-term rule for a sequence</li> </ul>	<p>Mini-Assessment 6</p>
<p><b>To learn how to generate a sequence from the nth term and find the nth term for a sequence</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to generate a linear sequence using the nth term</li> <li>• Students will understand the relationship between the nth term of a sequence and the terms in a sequence, for example a '2n' sequence goes up in 2s etc</li> <li>• Students will know how to find the nth term of a linear sequence</li> </ul> <p><b>Opportunity for Challenge:</b></p> <ul style="list-style-type: none"> <li>• Students will know how to generate a quadratic sequence from its nth term</li> <li>• Students will know how to find the nth term of a pattern sequence.</li> </ul>	<p><b>Generate</b> – produce or create.</p> <p><b>Substitute</b> – use or add in place of</p>	<ul style="list-style-type: none"> <li>• Students will need to know how to substitute numbers into linear formulae</li> </ul>	<p>Mini-Assessment 6</p>
<p><b>To learn how to find and use the nth term of a linear sequence</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to find the nth term of a linear sequence.</li> <li>• Students will know how to find the nth term of a pattern sequence.</li> <li>• 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</li> <li>• Students will know how to find and use the nth term to determine whether a number will be in a linear sequence</li> </ul>	<p><b>Nth Term</b> – a formula that enables us to find any term in a sequence. The 'n' stands for the term number</p>	<ul style="list-style-type: none"> <li>• Students will need to know how to solve linear equations</li> </ul>	<p>Mini-Assessment 6</p>

Lesson Objective	Intended Knowledge: <i>Students will know that...</i>	Tiered Vocabulary	Prior Knowledge: <i>In order to know this, students need to already know that...</i>	Assessment
<p><b>To learn how to write and plot coordinates in all four quadrants</b></p>	<ul style="list-style-type: none"> <li>• Students will need to know that the horizontal axis is the x-axis and that the vertical axis is the y-axis.</li> <li>• Students will know how to plot coordinates in all four quadrants.</li> <li>• Students will know how to write the coordinates of a point plotted in any of the four quadrants</li> <li>• Students will know how to solve shape problems involving plotting coordinates</li> <li>• Students will know how to plot and draw graphs that are parallel to either the x- or y-axis (equations in the form <math>y = a</math>, <math>x = a</math>)</li> <li>• Students will know how to plot the graphs of <math>y = x</math> and <math>y = -x</math></li> </ul> <p><b>Opportunity for challenge:</b></p> <ul style="list-style-type: none"> <li>• Students will know how to plot graphs in the form <math>y = x + c</math> or <math>y = x - c</math></li> </ul>	<p><b>Coordinate</b> – two numbers or sometimes a letter and a number, that locate a specific point on a grid. They are written in the form <math>(x, y)</math> most commonly.</p> <p><b>Vertical</b> – something that is vertical stands or points straight up</p> <p><b>Horizontal</b> – something that is arranged sideways, parallel to the horizon, like a person lying down</p> <p><b>Quadrant</b> – one of the four quarters of the coordinate plane</p>	<ul style="list-style-type: none"> <li>• Students will need to know how to read from a number line</li> </ul>	<p>Mini-Assessment 6</p>
<p><b>To learn how to draw straight line graphs</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to plot graphs in the form <math>y = x + c</math> or <math>y = x - c</math></li> <li>• Students will know how to plot graphs in the form <math>y = mx</math></li> <li>• Students will know how to plot straight line graphs in the form <math>y = mx + c</math> by first completing a given table of values</li> <li>• Students will know how to plot straight line graphs in the form <math>y = mx + c</math> by constructing their own table of values</li> </ul> <p><b>Opportunity for challenge:</b></p> <ul style="list-style-type: none"> <li>• Students will know how to plot and draw graphs of straight lines in the form <math>x + y = c</math></li> </ul>	<p><b>Substitute</b> – use or add in place of</p>	<ul style="list-style-type: none"> <li>• Students should already know how to substitute positive and negative integers into formulae</li> </ul>	<p>Mini-Assessment 6</p>
<p><b>To learn how to interpret the equation of a straight line and calculate gradient</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to identify the gradient and y-intercept of a straight line given the equation in the form <math>y = mx + c</math></li> <li>• Students will know how to calculate gradient between two pairs of coordinates.</li> <li>• Students will know that <b>gradient</b> = <math>\frac{\text{change in } y}{\text{change in } x}</math></li> </ul>	<p><b>Gradient</b> – steepness. The gradient of a line tells us how steep the line is.</p>	<ul style="list-style-type: none"> <li>• Students will need to know how find the difference between two numbers</li> </ul>	<p>Mini-Assessment 6</p>
<p><b>To learn how to find the equation of a straight line</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to identify the gradient and y-intercept of a straight line given the equation.</li> <li>• Students will know that <b>gradient</b> = <math>\frac{\text{change in } y}{\text{change in } x}</math></li> <li>• Students will know that the equation of a straight line can be written in the form <math>y = mx + c</math> where <math>m</math> tells us the gradient of the line and <math>c</math> tells us the y-intercept</li> <li>• Students will know how to find the equation of a given straight line</li> </ul>	<p><b>Intercept</b> – cross</p> <p><b>Y-intercept</b> – the y-intercept tells us where a graph crosses the y-axis, this where <math>x = 0</math></p> <p><b>X-intercept</b> – the x-intercept tells us where a graph crosses the x-axis, this where <math>y = 0</math></p> <p><b>Gradient</b> – steepness. The gradient of a line tells us how steep the line is.</p>	<ul style="list-style-type: none"> <li>• Students need to know how to write coordinates</li> </ul>	<p>Mini-Assessment 6</p>
<p><b>To learn how to draw quadratic graphs</b></p>	<ul style="list-style-type: none"> <li>• Students will know how to use a calculator to generate points for a quadratic graph in the form <math>y = ax^2 + bx + c</math> where <math>a = 1</math> and <math>b</math> and <math>c</math> are any integer including 0</li> <li>• Students will know how to plot a quadratic graph once they have generated the points</li> <li>• Students will know that the points for a quadratic graph should be joined with a smooth curve</li> </ul>	<p><b>Quadratic</b> – An expression or equation where the highest power is 2.</p> <p><b>Parabola</b> – the U or <math>\cap</math> shape of a quadratic graph</p>	<ul style="list-style-type: none"> <li>• Students will need to know how to substitute both positive and negative integers into formulae</li> </ul>	<p>Mini-Assessment 6</p>