

# Scheme of Learning: Year 11 Higher Autumn Term

## Topic Sequence: Graphs

1	2	3	4
Gradients and Lines	Non-Linear Graphs	Using Graphs	Graph Transformations

## Topic Overview: Non-Linear Graphs

Students revise conversion graphs and reflection in straight lines and also study other real-life graphs, including speed/distance/time, constructing and interpreting these and also investigate the area under a curve and its relationship to rates of change graphs. Content includes plotting and interpreting graphs of non-standard functions in real-life contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration. Students also interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in different contexts. Students calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear) and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts.

## Learning Sequence:

### Interpret and construct distance/time graphs

Students discover how the gradient of a distance/time graph represents the speed of travel and read, interpret and construct distance/time graphs.

### Speed/Time graphs

Students discover how the gradient on a speed/time graph represents the acceleration and that a negative gradient now represents deceleration. The area under a graph is the distance travelled

### Calculate the area under a graph

Students calculate areas under graphs consisting of straight lines, by creating shapes under the graph such as rectangles, triangles and trapezia. Students should know that the area under a speed-time graph represents distance.

### Estimate the gradient at a point on a curve

Students estimate the gradient at a point on a curve by drawing a tangent at that point and working out its gradient. Students also interpret the meaning of the gradient given the concept of the graph. Students should know that if the vertical axis represents distance on a distance-time graph, then the gradient will represent speed. Also that if the vertical axis represents velocity on a velocity-time graph, then the gradient will represent acceleration. Student investigate that the rate of change at a particular instant in time is represented by the gradient of the tangent to the curve at that point

### Estimate the area under a curve

Students use the area of trapezia, triangles and rectangles to estimate the area under a curve and interpret the meaning of the area in relation to the graph itself

### Calculate the average rate of change

Students construct chords between two points on a curve to calculate the average rate of change over time which is represented by the gradient of the chord.

Sequence of Learning:		Topic Resources:	
		<b>Knowledge Map:</b>	Non-Linear Graphs quadratic and cubic Non-Linear Graphs other including circles Circles including Theorems
<b>1</b>	Interpret and construct distance/time graphs	<b>Assessment:</b>	
<b>2</b>	Speed/time graphs	<b>Knowledge:</b>	End of Topic test
<b>R</b>	Area under a graph	<b>Application of Knowledge:</b>	Termly summative assessment
<b>4</b>	Gradient at a point on a curve	<b>Supportive Reading:</b>	
<b>5</b>	Estimate the area under a curve	<b>Any supported reading listed here</b>	Sparx Maths <a href="http://www.sparxmaths.co.uk">www.sparxmaths.co.uk</a> Corbett Maths : <a href="http://www.corbettmaths.com">www.corbettmaths.com</a>
<b>6</b>	Calculate the average rate of change		AQA Revision Guide