

# Scheme of Learning: Year 8 Autumn Term

## Topic Sequence: Representations

4	5	6
Working in the Cartesian Plane	Representing Data	Tables and Probability

## Topic Overview: Working in the Cartesian Plane

Building on KS2 knowledge of coordinates, students will look formally at algebraic rules for straight lines, starting with lines parallel to the axes and moving on to the more general form. They can explore notion of gradient and intercept but focus is on using equations to plot lines –  $ma + nd + c$  will be covered fully in year 9. They will appreciate connections and similarities to sequences and lists of coordinates and lines. Higher strand students can explore non linear graphs and midpoints of line segments.

## Lesson Sequence:

### Work with coordinates in all four quadrants

Students build on KS2 knowledge of coordinate plane, created by the intersection of two number lines in 2D space, developing their understanding of x and y axes and the origin. Students can draw their own axes and need careful support with labelling. Students should be able to label the 4 quadrants.

### Lines parallel to the axes

Idea of straight line as infinite set of points with common feature. Understand that lines parallel to axes take form of  $y = a$  and  $x = a$ .

### Recognise and use the line $y = x$

First diagonal line that they will study – explicitly cover that only be a 45 degree angle if scale on both axes is the same. Higher students will look at  $y = -x$ .

### Recognise and use the line $y = kx$

This step builds on understanding of  $y = x$  by introducing  $k$  and highlighting its effect on line steepness.

### Direct proportion using $y = kx$

Introduce the idea of direct proportion with tables and link variables to  $x$  and  $y$  axes.

### Gradient of line $y = x$

Gradient introduced with triangle on a straight line. Examples of mountains to explain steepness.

### Lines in the form $y = x + a$

Students now consider the impact of adding a constant to line  $y = x$ . Students encouraged to explore effect this has on straight line by generating tables of values and plotting these.

### Graphs with negative gradients

Introduce negative gradient with idea of ski slope. Then students can draw linear graphs with a negative gradient.

### Linking graphs to sequences

Students link prior knowledge of sequences with linear equations and their respective graphs.

### Plotting $y = mx + c$ graphs

Students develop understanding of equations of straight lines by using general form of  $y = mx + c$ . Interpretation will be covered in later steps.

### Exploring non-linear graphs (H)

Introduction to plotting non linear graphs. Discuss why it is inappropriate to join coordinates with a straight line.

### Midpoint of line segment (H)

Students firstly consider midpoints on number lines. They build on this to find coordinates of line segment.

### Work with coordinates in all four quadrants

Students need to be confident in drawing and labelling axes. A wide range of examples will be used as well as examples of appropriate and inappropriate

Sequence of Lessons:		Topic Resources:	
1	Work with coordinates in all four quadrants	Knowledge Map:	Linear Graphs
2	Identify and draw lines parallel to axes		
3	Recognise and use line $y = x$	Assessment:	
4	Recognise and use lines in form $y = x$	Knowledge:	End of Topic Test
5	Link $y = kx$ to direct proportion	Application of Knowledge:	Termly Summative Assessments
6	Explore gradient of $y = kx$ (H)		
7	Recognise and use lines in form $y = x + a$	Supportive Reading:	
8	Explore graphs with negative gradient	Any supported reading listed here	Sparx Maths <a href="http://www.sparxmaths.co.uk">www.sparxmaths.co.uk</a>
9	Link graphs to linear sequences		Corbett Maths : <a href="http://www.corbettmaths.com">www.corbettmaths.com</a>
10	Plot graphs in form $y = mx + c$		AQA Revision Guide
11	Explore non linear graphs (H)		
12	Find midpoint of line segment (H)		