

Scheme of Learning: Year 9 Autumn Term

Topic Sequence: Reasoning with Algebra

1	2	3
Straight Line Graphs	Forming and Solving Equations	Testing Conjectures

Topic Overview: Straight Line Graphs

Straight Line Graphs in Year 9 builds on Year 8 content where students plotted simple straight line graphs. They now study $y = mx + c$ as the general form of the equation of a straight line, interpreting m and c in abstract and real-life contexts, and reducing to this form in simple cases. This will be explored further when students rearrange formulae. Top sets will also consider inverse relationships and perpendicular lines.

Learning Sequence:

Lines parallel to the axis

This small step revises content covered earlier in KS3. Students need to be able to plot and recognise lines in the form ' $x = a$, $y = b$, $y = x$ and $y = -x$ '. Students should understand that the equation of a line describes a relationship between any pair of coordinates on that line and so that any point on any line $y = 3$, the y coordinate is equal to 3.

Using tables of values (R)

Students need to be able to complete and use a table of values to plot a straight line graph. The use of function machines can enable students to understand how the y coordinate is generated. Students should start to look for patterns in their tables of values using varying amounts of increases in x .

Compare gradients

Students need to recognise that the coefficient of x in the equation $y = mx + c$ tells us the gradient of the line using both positive and negative values of m in lines of the form $y = mx$ before moving onto lines in the form $y = mx + c$. Students should be aware that the greater the gradient of the line, the steeper the line is.

Compare intercepts

Students focus on how the value of c affects a line, looking first at lines in the form $y = x + c$ before moving onto lines in the form $y = mx + c$. Students need to be familiar with the term *y-intercept* to describe the point at which a graph intersects with the y -axis.

Understand and use $y = mx + c$

Students bring together what they have covered in previous small steps to interpret the equation of a line, identifying both gradient and the y -intercept. They need to know that when two lines have the same gradient, they are parallel and that the coordinates of the y -intercept are $(0, c)$.

Write an equation in the form $y = mx + c$ (H)

Students study simple equations that require one step of rearrangement / deduction to analyse straight line graphs.

Find the equation of a line from a graph

Students need to find the gradient and the y -intercept from a graph, remembering to look carefully at the scales of the graphs before calculating the gradients.

Gradient / Intercept of real life graphs

Students continue to find the gradient and y -intercept of a line, now interpreting it in a given context. They should be aware that graphs that do not start at $(0, 0)$ do not represent direct proportion.

Model real-life graphs involving inverse proportion (H)

Students continue to look at real life graphs, but focus of graphs that show inverse proportion. Students should understand that as the graph is not straight, they will be unable to find a gradient or y -intercept, but understand that impact of having no resources or infinite resources. A house cannot be built with no workers, and even with infinite workers it will still take time to construct.

Explore perpendicular lines (H)

This step should build upon students knowledge of perpendicular lines, being able to recognise them on a graph. Looking at lines such as $y = 2x$ and $y = 0.5x$, students should recognise the products of gradients of a pair of perpendicular lines will always be -1 . This should lead to students knowing that the gradient of one perpendicular line is the negative reciprocal of the other.

Sequence of Learning:

1	Lines parallel to the axes (R)
2	Using tables of values (R)
3	Compare gradients
4	Compare intercepts
5	Understand and use $y = mx + c$
6	Write an equation in the form $y = mx + c$
7	Find the equation of a line from a graph
8	Interpret gradient and intercepts of real-life graphs
9	Model real-life graphs involving inverse proportion (H)
10	Explore perpendicular lines (H)

Topic Resources:

Knowledge Maps:	Linear Graphs
Assessment	
Knowledge:	End of Topic test
Application of Knowledge:	Termly mixed topic assessment
Supportive Reading:	
	Sparx Maths www.sparxmaths.co.uk
	Corbett Maths : www.corbettmaths.com
	AQA Revision Guide