

Year 11 Autumn T1 - Topic: Bearings and Scale Drawings

Prior learning:

Understand congruence and identifying congruent shapes
 Draw and measure lines and angles

Construct circles
 Understand equidistance

Objectives			
End Points		Foundation	Crossover
- Find bearings from diagrams and worded questions - Use and interpret scale factors, scale drawings and maps (H) Bearings with Pythagoras and Trigonometry	Learning Steps	- Know the three rules of bearings - Find the bearing between two points - Draw a point on a fixed bearing from another point - Given a bearing, find the reverse bearing - Use and interpret map scales - Draw and interpret scaled diagrams in real-life contexts	Bearings with Pythagoras
			Higher
			Bearings with Trigonometry

Where will we use these ideas again:

Bearings will be revisited again with trigonometry and angles in parallel lines and scale drawings as a concept is revisited within enlargement.

Higher: Bearings with sine rule and cosine rule

Year 11 Autumn T1 - Topic: Handling Data 2

Prior learning:

Average and range from a list

Frequency polygons

Averages and range from a frequency table

Objectives			
End Points	Learning Steps	Foundation	Crossover
○ Recap: frequency polygons ○ Construct cumulative frequency diagrams ○ Construct and interpret box plots ○ Compare box plots ○ Construct and interpret histograms		○ Recap – Prior knowledge of averages and range and frequency polygons	○ Construct and interpret cumulative frequency diagram (excluding IQR and median) ○ Use a cumulative frequency diagram to estimate the median and interquartile range ○ Construct and interpret a box plot ○ Compare two or more distributions (median, range, IQR) and make a contextual statement ○ Calculate estimates of statistical measures from graphical representations of grouped data
			Higher
			○ Construct histogram with unequal class intervals ○ Interpret histogram with unequal class intervals ○ Problem solving with histograms

Where will we use these ideas again:

Year 11 Autumn T1 - Topic: Non-Linear Graphs - HIGHER

Prior learning:

Draw and interpret linear graphs

Sketch quadratics

Draw quadratic graphs

Substitution and solving

Identify turning points and roots of quadratic graphs

Completing the square

Objectives			
End Points		Foundation	Crossover
- Interpret real life graphs - Draw and interpret cubic graphs - Draw and interpret reciprocal graphs - Draw and interpret exponential graphs (H) Recap: completing the square (H) Use completing the square to sketch quadratic graphs (H) Equation of a circle (H) Tangent of a circle	Learning Steps	- Recap – drawing linear and quadratic graphs - Recognise graphs from real life scenarios (e.g. filling different flasks) - Plot and draw a cubic graph - Recognise and sketch simple cubic functions - Recognise non-linear graphs and their equations - Plot and draw a reciprocal graph - Recognise and sketch simple reciprocal functions	- Recognise and sketch the exponential graph - Plot and draw an exponential graph - Solve problems involving the exponential function - Recap - Complete the square by rewriting quadratics - Recap - Use completing the square to solve equations - Use completing the square to find maximum and minimum values
			Higher - Sketch a more complex quadratic graph, finding the turning points by completing the square - Know and use the equation of a circle - Find the equation of a circle - Find the equation of a tangent to a circle

Where will we use these ideas again:

Year 11 Autumn T1 - Topic: Non-Linear Graphs

Prior learning:

Re-arrange formula

Represent inequalities on a number line

Solve linear inequalities

Drawing linear and quadratic graphs

Objectives			
End Points	Learning Steps	Foundation	Crossover
○ (H) Solve inequalities graphically ○ (H) Solve quadratic inequalities graphically		○ Recap – solving and representing linear inequalities	
			Higher
			○ Solve a set of linear inequalities in two or more variables and represent solution as a region of a graph ○ Solve quadratic inequalities graphically ○ Solve quadratic inequalities ○ Identify the set of values that satisfy two or more quadratic inequalities or a quadratic inequality and linear inequality

Year 11 Autumn T2 - Topic: Combined Events and Probability Trees

Prior learning:

Express a probability as fraction, decimal or percentage

Mutually exclusive events

‘OR’ rule in probability

Systematic listing

Relative and theoretical probability

Estimate outcomes

Objectives			
End Points		Foundation	Crossover
- Interpret and draw Venn diagrams - Use set notation - Probability and Venn diagrams - Draw and interpret tree diagrams with replacement - Draw and interpret tree diagrams without replacement - Successive probabilities - Algebra and probabilities	Learning Steps	- Recognise and define the universal set - Sort data into a Venn diagram - Find the intersection from a Venn diagram - Find the union from a Venn diagram - Complete and use Venn diagrams to find frequencies - Recognise and use the notation for intersection, union and complement - Design a Venn diagram to solve multi-step problems - Use a Venn diagram to calculate probability - Understand of Venn Diagrams to three regions - Complete a probability tree diagram involving independent events - Find probabilities of successive independent events from a tree diagram - Understanding how probabilities change in experiments without replacement - Complete a probability tree diagram involving dependent events (e.g. without replacement) - Find the probability of an event occurring given information as ratios - Understand the concept of conditional probability	- Find probabilities of dependent events from a tree diagram - Find conditional probability from a table, Venn diagram or tree diagram - Find probabilities of successive independent events without a tree diagram - Find the probability of a combination of mutually exclusive events from a tree diagram
			Higher
			- Find probabilities of successive dependent events without a tree diagram - Extend understanding of Venn Diagrams to three regions - Forming equations with dependent and independent events

Year 11 Spring T1 - Topic: Trigonometry 2

Prior learning:

Know exact values of trigonometric values
Find missing lengths using trigonometry
Find missing angles using trigonometry

3D Trigonometry
Pythagoras and Trigonometry

Objectives			
End Points	Learning Steps	Foundation	Crossover
○ Understand and apply the sine rule ○ Understand and apply the cosine rule ○ Area of non-right angle triangle ○ 3D trigonometry		○ Recap – trigonometry to find lengths and angles ○ Recap – exact values of trigonometry ○ Use trigonometry to calculate angles of elevation	○
			Higher
			○ Use the sine rule to find missing sides and angles in non-right angled triangles ○ Use the cosine rule to find missing sides and angles in non right angled triangles ○ Find the area of triangles using $\frac{1}{2}ab\sin C$ ○ Solve 3D problems involving trigonometry ○ Trigonometry and Bearings

Year 11 Spring T1 - Topic: Fractions and Algebraic Proof

Prior learning:

Algebraic Expressions
Changing the subject

Substitution
Plotting Graphs

Objectives			
End Points	Learning Steps	Foundation	Crossover
○ Prove and counter example statements ○ Algebraic proof ○ Substitute into basic and composite functions ○ Find inverse functions		○ Use mathematical reasoning (e.g. counter-example) to prove or disprove arithmetic statements	○
			Higher
			○ Complete algebraic proofs ○ F(x) notation ○ Evaluate functions by substituting values of x ○ Find the inverse of a basic function where x appears only once ○ Find the inverse of a basic function where x appears more than once ○ Define a composite function ○ Evaluate a composite function by substituting values of x ○ Solve equations involving functions and composite functions ○ Evaluating functions with indices

Year 11 Spring T1 & 2- Topic: Vectors

Prior learning:

Simplify expressions
Expand expressions

Factorise expressions

Objectives			
End Points	Learning Steps	Foundation	Crossover
○ Represent vectors in 2D ○ Calculate with vectors in 2D ○ Vector problems including ratios			○ Represent a two-dimensional vector as a column vector ○ Multiply and divide vectors by scalars ○ Add and subtract vectors and/or multiples of vectors
			Higher

Year 11 Spring T2- Topic: Iteration, Geometric and Complex Sequences

Prior learning:

Special sequences
Fibonacci sequences

Recognise geometric sequences

Objectives			
End Points	Learning Steps	Crossover	Higher
- Recap Linear sequences - Recognize and use non-linear sequences - Geometric sequences - Iteration - Approximate solutions with iteration - Quadratic sequences - Sequences and algebra		- Recognise and use sequences of triangular, square and cube numbers - Recognise and use Fibonacci type sequences - Recap of arithmetic sequences specifically with algebra - Generate a simple geometric progression given a and r (where n is an integer, and r is a rational number > 0 or a surd) - Write and use the formula for a geometric progression - Find a given term of a geometric progression	- Understand the meaning of iteration and use iterative processes - Generate a sequence using an iterative rule - Solve equations such as $x^3 + x = 12$ using trial and improvement - Solve equations using an iteration formula - Show a solution lies in an interval using change of signs - Find the next term of a quadratic sequence - Find the nth term of quadratic sequences - Geometric sequences and algebra

Year 11 Spring T2 and Summer T1 - Topic: Trig Graphs and Graph Transformations

Prior learning:

Drawing velocity time graphs

Exact values of trigonometry

Objectives			
End Points		Foundation	Higher
- Recap – velocity time graphs - Acceleration - Distance from velocity time graph - Gradient of tangents - Area under a curve - Drawing and using trigonometric graphs - Transformation of graphs	Learning Steps	Recap – drawing velocity time graphs	- Calculate acceleration from a velocity-time graph - Calculate the distance travelled from a velocity-time graph - Estimate the gradient of a tangent to a curve - Find the gradient to a tangent of a curve - Find the area under a graph made up of straight lines - Find the area under a curve using rectangles - Find the area under a curve using trapezia - Recognise and draw the graphs of sine and cosine - Recognise and draw the graph of tangent - Evaluate the sine, cosine and tangent of angles greater than 90° - Solve simple trig equations using graphs - Transform the graphs of polynomial functions - Transform graphs of trigonometric functions - Transform a function, $f(x)$ - Use completing the square as a transformation of x^2 to sketch a graph