



Year 9 Mathematics – Units 1, 2 & 3

Learning about this topic is important because: This topic sharpens your ability to recognise patterns and graphs created by numbers. Graphs, line equations, and formulae are used across subjects and real-life contexts like physics, geography, and business. It will help you build confidence in interpreting them by connecting to your prior learning.

This builds on: Builds on KS2 number sequences, Year 7 function machines, and order of operations. Also extends Year 7 and 8 work on nth term, linear graphs, substitution, simplifying expressions, solving equations, and inverse operations.

This leads to: Solving ratio and proportion problems, conversion graphs for exchange rates and currency, rates of change in SDT graphs and substituting into the Pythagorean formula.

We will learn:

- How to describe line graphs that do not cross through the origin
- How to calculate gradients and y-intercepts so we can write an equation as $y = mx + c$
- How to apply equations to real-life graphs including direct proportion as well as drawing graphs of inverse proportion
- How to solve two-step equations and inequalities with x on both sides and with negative numbers
- How to solve problems with equations and inequalities in context
- How to explore perpendicular gradients
- How to rearrange simple and complex formulae with brackets and squares

We will develop/practise skills including:

- Identifying patterns in coordinates and the relationship between them such as in sequences
- Creating equations that represent lines that cross through the origin or are vertical and horizontal
- Using properties of direct proportion graphs to analyse if a graph is in direct proportion or not
- Using fact families, bar models and function machines to identify inverse operations
- Substituting values into equations
- Solving inequalities and checking answers to them
- Problem solving by applying our new learning
- Developing mathematical arguments using algebra

Talk for Learning / Oracy in Maths

In this topic, you will use key terms such as *parallel*, *vertical*, *horizontal*, *straight line*, *equation*, *intercept*, *gradient*, *coordinate*, *function*, and *table of values* to describe and work with linear graphs. You'll also learn to *rearrange* equations and explore concepts like *direct* and *inverse proportion*.

Other important vocabulary includes *perpendicular*, *negative reciprocal*, *inverse*, *expand*, *greater than*, *less than*, *balance*, *substitute*, *variable*, *subject of*, *expression*, *term*, *coefficient*, *power*, *base*, *numerator*, and *denominator*.

Keep these questions in mind as you work through tasks: **What can I see? What do I know? What can I do?**

You could learn more about this topic by:

Watching videos and complete additional questions on Sparx, research about different types of non-linear graphs, completing all classwork and homework, speaking to your classmates or teacher.

Your teacher will assess your knowledge & understanding by looking at your Classwork, Sparx Homework, through questioning and discussion. They will give you feedback in lots of different ways. The key pieces of work in this topic are your low stakes end of topic tests and your termly cumulative assessments.



Year 9 Mathematics – Units 1, 2 & 3



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Year 9 Mathematics – Units 4 & 5

Learning about this topic is important because:

It helps us to apply our knowledge of angles in shapes to drawing them on paper and understanding how they can be made. Constructions and angles are used in art careers such as woodworking and graphic design, as well as in cartography and wayfinding.

This builds on: Work done at Year 7 and 8 from finding the area of trapezia and circles, constructing angles and knowing the sum of angles in triangles and quadrilaterals.

This leads to: Understanding the conditions for congruent triangles for proof, exploring areas and volume of similar shapes, solving loci problems and forming proof with congruent triangles.

We will learn:

- How to form and test conjectures
- How to recognise different 2D and 3D shapes by their properties
- How to sketch nets, plans and elevations
- How to calculate the area of 2D shapes
- How to find the surface areas of cuboids, prisms and cylinders
- How to calculate the volume of cuboids, prisms and cylinders as well as exploring volumes of pyramids, cones and spheres
- How to construct loci of distances from a point, from a straight line and a shape
- How to construct a locus equidistant from two points and from two lines
- How to construct an angle bisector, a perpendicular bisector from a point and perpendicular bisector to a point
- How to identify congruent figures and triangles

We will develop/practise skills including:

- Calculating areas of 2D shapes, including in compound shapes and on nets
- Finding missing lengths of shapes
- Applying our knowledge of angle rules in unfamiliar circumstances
- Using compasses and a pencil to construct accurately
- Constructing angles and measuring them with protractors

Talk for Learning / Oracy in Maths

In this topic, you will use important vocabulary such as *dimension, cube, cuboid, cylinder, cone, sphere, pyramid, tetrahedron, face, edge, vertex, polygon, cross-section, net, area, elevation, solid, and isometric*. You will also work with terms like *perpendicular, compound, circumference, acute, obtuse, reflex, right angle, conversion, ratio, multiplier, equidistant, construction lines, locus, arc, congruent, invariant*, and the triangle congruence rules *SSS, SAS, ASA*.

You should use this vocabulary clearly when explaining your methods, both in writing and speaking.

Keep these questions in mind as you work through tasks: **What can I see? What do I know? What can I do?**

You could learn more about this topic by:

Watching videos and complete additional questions on Sparx, research about constructing various shapes with a compass, completing all classwork and homework, speaking to your classmates or teacher.

Your teacher will assess your knowledge & understanding by looking at your Classwork, Sparx Homework, through questioning and discussion. They will give you feedback in lots of different ways. The key pieces of work in this topic are your low stakes end of topic tests and your termly cumulative assessments.



Year 9 Mathematics – Units 6, 7 & 8

Learning about this topic is important because:

It allows us to be able to calculate percentages in real life and make comparisons between supermarket offers as well as the savings we can make in savings accounts and investments. Knowing how to calculate profit, loss and deal with multipliers makes us able to evaluate problems in business contexts such as working for yourself and starting your own business. Learning about wages and taxes also helps us to be able to analyse pay slips and bills that we might get in the future.

This builds on:

Work done at Year 9 on fractions, decimals and percentages as well as multipliers

This leads to:

Solving more complex problems with percentages and interest, solve problems involving growth and decay and understanding iterative processes.

We will learn:

- Solve 'reverse' percentage problems
- Solve problems with repeated percentage change
- Understand and use surds
- Solve problems with integers, real, fractional and decimal numbers
- Solve problems with bills and bank statements
- Calculate simple and compound interest
- Calculate wages, taxes and VAT
- Solve problems with exchange rates
- Solve unit pricing problems

We will develop/practise skills including:

- Using percentages and multipliers to calculate efficiently on the calculator
- Understanding repeated percentage change
- Applying percentage skills to real problems
- Using ratio to calculate cost per item to compare prices

Talk for Learning / Oracy in Maths

In this topic, you will use key terms such as *fraction*, *decimal*, *percentage*, *multiplier*, *increase*, *decrease*, *profit*, *loss*, *invest*, *reverse*, *tax*, *exchange rate*, and *VAT*. These words will help you work confidently with financial calculations and understand how amounts change in different contexts.

You should use this vocabulary clearly when explaining your methods, both in writing and speaking.

Keep these questions in mind as you work through tasks: **What can I see? What do I know? What can I do?**

You could learn more about this topic by:

Watching videos, completing additional questions on Sparx, researching about tax and HMRC, completing all classwork and homework, speaking to your classmates or teacher.



Your teacher will assess your knowledge & understanding by looking at your Classwork, Sparx Homework, through questioning and discussion. They will give you feedback in lots of different ways. The key pieces of work in this topic are your low stakes end of topic tests and your termly cumulative assessments.



Year 9 Mathematics – Units 9, 10 & 11

Learning about this topic is important because: It allows us to apply these skills to real life problems such as woodworking, and constructions with compasses. Rotational symmetry is important in physics because it allows scientists to make their experiments and calculations easier.

This leads to: Calculating the area of circles, surface area and volume of prisms in Y10. It will also lead to transformations of graphs in Y11 and potentially to A Level transformations.

We will learn:

- Solving angle problems with algebra
- Conjectures with angles and shapes
- Compare and contrast line symmetry with rotational symmetry
- Rotate a shape about a point
- Translate points and shapes by a given vector
- Compare reflection and rotation of shapes
- Find the results of a series of transformations

We will develop/practise skills including:

- Using rules of angles
- Identify the order of rotational symmetry of a shape

Talk for Learning / Oracy in Maths

In this topic, you will use key terms such as *perimeter*, *alternate*, *corresponding*, *co-interior*, *parallel*, and *transversal* to describe properties of angles and lines. You'll also explore *symmetry*, including *rotational symmetry*, and transformations like *translation* and *vector*.

Additionally, you will use words like *conjecture*, *prove*, *justify*, and *counterexample* to develop and explain mathematical arguments clearly and logically.

You should use this vocabulary clearly when explaining your methods, both in writing and speaking.

Keep these questions in mind as you work through tasks: **What can I see? What do I know? What can I do?**

You could learn more about this topic by:

Watching videos, completing additional questions on Sparx, researching about algebraic angle problems and how circle areas are used in industry, completing all classwork and homework, speaking to your classmates or teacher.

Your teacher will assess your knowledge & understanding by looking at your Classwork, Sparx Homework, through questioning and discussion. They will give you feedback in lots of different ways. The key pieces of work in this topic are your low stakes end of topic tests and your termly cumulative assessments.



Year 9 Mathematics – Units 12, 13 & 14

Learning about this topic is important because: Pythagoras is an important theorem used by carpenters, engineers and to solve daily spatial problems. Best-buy problems are extremely useful when trying to find the best value for money on a product that you might buy and the ability to interpret different types of proportion graphs allows you to engage in and understand in scientific conclusions and research outcomes.

This leads to: Solving complex multi-step algebraic problems with Pythagoras. Also, you will be learning about negative scale factor enlargements and creating equations for direct and inverse proportion up to Year 11.

We will learn to:

- Determine whether a triangle is right- angled
- Calculate the hypotenuse and missing sides of a right-angled triangle
- Use Pythagoras Theorem on coordinate axes and in 3D shapes
- Recognise enlargement and similarity
- Enlarge a shape by a positive integer and positive fractional scale factor
- Work out missing sides and angles in a pair of given similar shapes
- Solve problems with direct and inverse proportion
- Identify graphs of inverse relationships
- Solve best buy problems

We will develop/practise skills including:

- Calculator skills - using square root and square buttons
- Calculating distances between coordinates in the x and y direction
- Use ratio skills to enlarge measurements and calculate scale factors
- Using direct proportion graphs to calculate values

Talk for Learning / Oracy in Maths

In this topic, you will use key terms such as *hypotenuse, right-angled triangle, integer, adjacent, opposite, sum, square root, quadrant, diagonal, ratio, scale factor, corresponding, multiplier, constant, relationship, variable, product, non-linear*, and *unit cost*. These words will help you understand and solve problems involving trigonometry, scaling, and algebraic relationships.

You should use this vocabulary clearly when explaining your methods, both in writing and speaking.

Keep these questions in mind as you work through tasks: **What can I see? What do I know? What can I do?**

You could learn more about this topic by:

Watching videos, completing additional questions on Sparx, researching about how engineers use Pythagoras' Theorem and real life examples of direct and Inverse proportion, completing all classwork and homework, speaking to your classmates or teacher.



Your teacher will assess your knowledge & understanding by looking at your Classwork, Sparx Homework, through questioning and discussion. They will give you feedback in lots of different ways. The key pieces of work in this topic are your low stakes end of topic tests and your termly cumulative assessments.



Learning about this topic is important because: It helps us to understand the relationship between speed, distance and time which applies to driving cars, as well as using equations that give us combined units for rates of change. It allows us to practise using formulae that we might not know for example the efficiency of a car is counted in 'miles per gallon' and is found by dividing miles by gallons. We also learn how probabilities are calculated for various events, for example in the lottery.

This leads to: Using probability tables and tree diagrams to estimate probabilities and predict outcomes. Interpreting gradients of speed time and distance time graphs. Solving problems regarding compound volumes of cylinders and spheres for example, to find the combined density.

We will learn to:

- Solve speed, distance, time problems without/with a calculator
- Use distance/time graphs
- Solve problems with density, mass and volume
- Solve flow problems and their graphs
- Calculate rates of change and their units

- Calculate and use relative frequency and expected outcomes
- Complete calculations with independent events
- Use tree diagrams to solve 'with' and 'without replacement' problems
- Use diagrams to work out probabilities
- Draw and interpret quadratic graphs
- Interpret other graphs, including reciprocal
- Represent inequalities

We will develop/practise skills including:

- Substitution into formulae
- Reading from graphs
- Using various standard units of measure
- Multiplying fractions
- Knowing that probabilities of an event must add to 1
- Writing inequality signs to describe desired values

Talk for Learning / Oracy in Maths

In this topic, you will use key terms such as *convert, accuracy, average, gradient, rearrange, density, mass, volume, per, curve, constant rate, flow, conversion, rate of change*, and *units* to describe and solve problems involving measurement and rates.

You will also explore vocabulary related to probability, including *event, outcome, biased, fair, trial, relative frequency, independent, sample space*, and *Venn diagrams* to help you understand and explain different probability scenarios.

You should use this vocabulary clearly when explaining your methods, both in writing and speaking.

Keep these questions in mind as you work through tasks: **What can I see? What do I know?**

What can I do?

You could learn more about this topic by:

Watching videos, completing additional questions on Sparx, researching about density and speed graphs and calculations in Science GCSE, completing all classwork and homework, speaking to your classmates or teacher.



Year 9 Mathematics – Units 15 & 16



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Your teacher will assess your knowledge & understanding by looking at your Classwork, Sparx Homework, through questioning and discussion. They will give you feedback in lots of different ways. The key pieces of work in this topic are your low stakes end of topic tests and your termly cumulative assessments.