



How does this unit link to prior learning?

- Have a firm grasp of place value and be able to order integers and decimals and use the four operations.
- Know integer complements to 10 and to 100, multiplication facts to 10×10 , strategies for multiplying and dividing by 10, 100 and 1000.
- Have encountered squares, square roots, cubes and cube roots and have knowledge of classifying integers.

Prior Knowledge Check

1. Round to one significant figure:

25

772

92

1054

0.86

2. Find the factors of 24

3. Write the first 5 multiples of 7

4. List the square numbers up to 100

5. List the prime number up to 30

6. Simplify $\sqrt{20}$

What will you be learning about?

- Using place value and reasoning to solve problems.
- Use estimation in calculations.
- Calculate HCF and LCM.
- Use surds and index form.

How does this link to the wider curriculum?

The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

1. Learning Journey, Listing Outcomes Listing outcomes using systematic method	RAG	2. Product Rule for Counting Work out the total number of ways of performing a series of tasks.	RAG
3. Rounding and Estimating Estimate an answer.		4. Place Value Calculations Use place value to answer questions.	
5. Highest Common Factor (HCF) - Write a number of the product of its prime factors. - Find the HCF and LCM of two numbers. - Use Venn Diagrams to find HCF. - Worded HCF problems.		6. Lowest Common Multiple (LCM) - Write a number of the product of its prime factors. - Find the LCM of two numbers. - Use Venn Diagrams to find LCM. - Worded LCM problems.	
7. Consolidation Lesson - Consolidation on all work covered so far on the topic. - Long periods of deliberate practice. - Should contain exam questions.		8. Indices in BIDMAS Use powers and roots in calculations.	
9. Basic Index Laws - Multiply and divide using index laws. - Work out a power raised to a power.		10. Negative Index Law Use negative indices.	
11. Fractional Index Law Use fractional indices.		12. Consolidation Lesson - Consolidation on all work covered so far on the topic. - Long periods of deliberate practice. - Should contain exam questions.	
13. Standard Form - Write a number in standard form. - Calculate with numbers in standard form.		14. Standard Form Calculations Mixed and worded standard form problems.	
15. Simplifying Surds - Understand the difference between rational and irrational numbers. - Simplify a surd.		16. Calculating with Surds - Multiplying and Dividing Surds - Adding and Subtracting Surds - Expanding brackets involving surds - Expanding double brackets involving surds - Area problems involving surds	
17. Rationalise the Denominator Rationalise the Denominator		18. Revision Lesson - Teacher assess the topics the class need to revise. - Classroom based or Mathswatch.	
19. Assessment Lesson (calculator) - Do 10-minute top up and go through answers together, students self-assess. - Open book assessment done in silence.		20. Feedback Lesson - Student to highlight their traffic light sheet. - Teacher to go through test and students to self-assess in green. - Complete the NOW section of the WOW-HOW-NOW sheet.	

Key Vocabulary

Estimate	Powers	HCF	Standard Form	LCM	Multiple	Surds	Powers	Indices	Factor
How will this help you in the future?									
KS4					Beyond LHS				

You develop systematic thinking and counting skills - Students learn to list outcomes methodically and use systematic approaches to ensure all possibilities are considered. - Supports GCSE probability and counting topics by developing organised problem-solving strategies.	You learn how systematic thinking is used in real life Systematic methods help people organise information and solve problems efficiently. - Careers that use systematic thinking include: - Software Developer, Data Analyst, Engineer, Scientist, Project Manager.
You build estimation and numerical fluency - Rounding and estimating activities help students judge the reasonableness of answers and check calculations efficiently. - Supports GCSE problem-solving by developing confidence with approximation and numerical accuracy.	You learn how estimation is used in everyday life Estimating helps people make quick decisions and check whether answers are reasonable. - Careers that use estimation include: - Quantity Surveyor, Engineer, Architect, Construction Manager, Retail Manager,
You strengthen problem-solving with HCF and LCM - Students apply Highest Common Factor and Lowest Common Multiple to real-life and exam-style problems. - Encourages interpretation of mathematical situations and selection of appropriate methods.	You learn how place value is used in real life Understanding place value helps people work confidently with numbers, money, and measurements. - Careers that use place value include: - Nurse, Pharmacist, Scientist, Financial Adviser, Business Manager
You develop confidence with indices and powers - Students learn to use powers and roots within calculations, including BIDMAS. - Supports GCSE algebra and prepares students for more advanced manipulation of numerical expressions.	You learn how factors and multiples are used in real life Factors and multiples help people organise schedules, resources, and production efficiently. - Careers that use these skills include: - Manufacturing Engineer, Civil Engineer, Logistics Coordinator, Software Developer, Production Manager, Operations Manager.
You strengthen mathematical reasoning through standard form - Students learn to write, interpret, and calculate with numbers in standard form. - Supports GCSE topics involving very large and very small numbers, particularly in science and mathematics.	You learn how powers and indices are used in real life Indices are used to represent growth, change, and large calculations efficiently. - Careers that use indices include: - Engineer, Data Analyst, Economist
You develop understanding of rational and irrational numbers - Simplifying surds introduces students to irrational numbers and exact forms. - Supports higher-level GCSE number work and algebraic manipulation.	You learn how standard form is used in real life Standard form helps people work with very large and very small numbers. - Careers that use standard form include: - Astronomer, Physicist, Engineer, Medical Researcher. You learn how exact calculations are used in real life Surds help provide precise answers when accuracy is important. - Careers that use exact calculations include: - Structural Engineer, Surveyor, CAD Designer, Product Designer.

How does this unit link to prior learning?

- Use negative numbers with the four operations and recall and use hierarchy of operations and understand inverse operations.
- Use a calculator for decimals and negative numbers.
- Use index laws numerically.
- Use and interpret algebraic notation.
- Set up and solve simple equations.
- Recall the definitions of geometric and arithmetic sequences

Prior Knowledge Check

1) If $x = 4$, what is the value of: a) $3x - 10$ b) $x^2 - 6$ c) $7 - 3x$

2) Expand $2(2x + 4)$

3) If your age is now "N" years write an expression for your age when you are 2 years less than double you current age.

4) Factorise the following expressions

$27x + 18$

$$9y^2 - 6y$$

5) The first 5 terms in a number sequence are 10 7 4 1 -2

a) Work out the n th term of the sequence

b) Work out the 50th term in the sequence

6) Write as a single power of 4

a) $4^9 \div 4^2$

b) $4^7 \div 4^4$

c) $(4^3)^{-5}$

What will you be learning about?		How does this link to the wider curriculum?	
- Understanding and writing algebraic expressions, simplifying and substituting into expressions. - Expanding brackets and factorising. - Rearranging formulae. - Solving problems with linear and non-linear sequences		The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.	
We will develop our learning each week by focusing on:			
1. Index Law Recap Use the rules of indices to simplify algebraic expressions.	RAG	2. Expanding Single Brackets Expand brackets by multiplying terms.	RAG
3. Factorising Linear Expressions Factorise algebraic expressions by finding the HCF.		4. Expanding Quadratics Expand the product of two brackets.	
5. Factorising Quadratics - Factorise quadratics of the form $x^2 + bx + c$. - When the coefficient of x is 1		6. Factorising Harder Quadratics - Factorise quadratics of the form $ax^2 + bx + c$. - When the coefficient of x is greater than 1	
7. Difference of Two Squares Use the difference of two squares.		8. Consolidation Lesson - Consolidation on all work covered so far on the topic. - Long periods of deliberate practice. - Should contain exam questions.	
9. Writing Expressions - Distinguish between expressions, equations, formulae and identities. - Form algebraic expressions from worded problems.		10. Substitution - Substitute numbers into formulae. - Including negative, brackets and indices.	
11. Substitution – Worded Problems Substitute numbers into worded problems.		12. Solving Equations Solve equations involving brackets and numerical fractions.	
13. Solving Equations – Worded Problems Form and solve equations from worded problems.		14. Changing The Subject Rearrange formulae.	
15. Consolidation Lesson - Consolidation on all work covered so far on the topic. - Long periods of deliberate practice. - Should contain exam questions.		16. Sequences Recap - Term to Term rule - Using the nth term to find a number in a sequence	
17. Linear Sequences Finding the nth term of a linear sequence		18. Quadratic Sequences Finding the nth term of quadratic sequences	
19. Revision Lesson - Teacher assess the topics the class need to revise. - Classroom based or Mathswatch.		20. Assessment Lesson - Do 10-minute top up and go through answers together, students self-assess. - Open book assessment done in silence.	
21. Feedback Lesson - Student to highlight their traffic light sheet. - Teacher to go through test and students to self-assess in green. - Complete the NOW section of the WOW-HOW-NOW sheet.			

Key Vocabulary									
Coefficient	Equation	Term	Expression	Factorise	Expand	Sequence	Identity	Indices	Formula
How will this help you in the future?									
KS4 You build the foundations for advanced GCSE algebra - Students develop fluency in expanding, factorising and simplifying algebraic expressions. - Supports key GCSE topics including quadratics, algebraic fractions and algebraic proof. You strengthen equation-solving and formula manipulation skills - Students solve increasingly complex equations and rearrange formulae confidently. - Prepares students for Higher GCSE algebra and mathematical modelling. You develop mathematical reasoning and problem-solving - Students form expressions and equations from real-life contexts and interpret solutions. - Supports GCSE AO2 and AO3 reasoning and problem-solving requirements. You build understanding of patterns and algebraic generalisation - Students use nth terms and sequences to identify relationships and predict future terms. - Supports progression to linear and quadratic functions at GCSE. You prepare students for GCSE examination success - Regular consolidation, deliberate practice and exam-style questions improve fluency and accuracy. - Encourages students to select efficient methods and apply skills independently in unfamiliar situations.					Beyond LHS You develop problem-solving skills valued by employers - Algebra teaches students to analyse information, identify patterns and solve problems logically. - Relevant careers include: Engineer, Accountant, Financial Analyst, Project Manager and Business Analyst. You build confidence in handling everyday calculations - Using formulae, substitution and equations helps students make informed decisions involving budgets, loans, savings and personal finances. - Relevant careers include: Bank Manager, Mortgage Adviser, Retail Manager, Entrepreneur and Estate Agent. You strengthen data and analytical thinking - Sequences, patterns and algebraic reasoning underpin many modern industries that rely on data and technology. - Relevant careers include: Data Scientist, Software Developer, Cyber Security Analyst, Statistician and Artificial Intelligence Engineer. You prepare for STEM and technical careers - Algebra provides the foundation for many technical and scientific disciplines. - Relevant careers include: Architect, Civil Engineer, Surveyor, Scientist, Electrician and Quantity Surveyor. You develop resilience and logical reasoning for future pathways - Multi-step algebraic problems encourage perseverance, accuracy and attention to detail. - Relevant careers include: Lawyer, Detective, Pilot, Pharmacist and Operations Manager.				



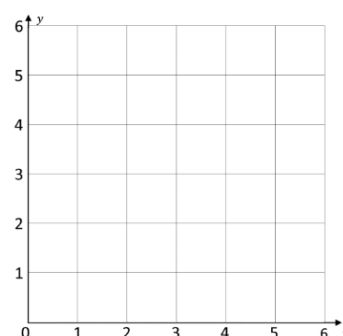
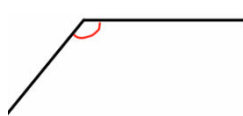
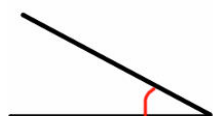
How does this unit link to prior learning?

Prior Knowledge and Link to New Learning

- **Find the range, mean, median and mode of a data set.**
Link to lessons 1 and 14: Finding Averages and Deciding Which is Best to Use, Comparing Data.
- **Find midpoint of two numbers.**
Link to lesson 1: Finding Averages and Deciding Which is Best to Use
- **Use inequality notation.**
Link to lesson 2 and 3: Range, Mode, Medium and Estimating The Mean From Grouped Data
- **Read and construct scales on graphs.**
Link to lesson 6: , 10, 11, 12, 13 and 15: Plotting and Interpreting Frequency Polygons, Time series graphs, Scatter Graphs and other Appropriate Diagrams to Display Data
- **Plot coordinates in the first quadrant.**
Link to lesson 6,10 and 12: Draw and Interpret Frequency Polygons, Time Series Graphs and Scatter Graphs
- **Measure and draw angles.**
Link to lesson 7: Drawing Pie Charts.

Prior Knowledge Check

- Find the mean, median, mode and range of the following numbers: 0, 1, 1, 3, 5, 6, 9
- Find the midpoint of the following pairs of numbers:
 - 4 and 10
 - 11 and 20
 - 4.5 and 10.5
- What integers satisfy the following inequalities:
 - $3 < x < 8$
 - $-2 < x \leq 3$
- Plot the following coordinates on the grid:
 - (3,2)
 - (1,4)
- Estimate the following angles:



What will you be learning about?

- Display data in several different ways.
- Interpret the graphs and diagrams to help analyse the data.

How does this link to the wider curriculum?

- The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

Lesson 1: Finding Averages and Deciding Which is Best to Use

- Be able to find the mean, median and mode from a data set.
- Calculate a 'reverse mean'.
- Be able to find the range from a set of data.
- Be able to decide which average is best to use.

RAG

Lesson 2: Estimating The Mean From a Table

- Be able to draw a frequency table and calculate the mean.
- Be able to draw a grouped frequency table and calculate the mean.

RAG

Lesson 3: Range, Mode and Median From Tables (inc Grouped Data) - Be able to estimate the range from a table (inc grouped data). - Be able to find the mode from a table and the modal group from a grouped frequency table. - Be able to find the group that contains the Median from a grouped frequency table.				Lesson 4: Construct and Use Two Way Tables - Be able to complete two way tables. - Be able to construct and complete two way tables from worded problems.			
Lesson 5: Draw and Interpret Stem & Leaf Diagrams (Including Back-to-Back) - Be able to draw a stem and leaf diagram. - Be able to draw a back-to-back stem and leaf diagram.				Lesson 6: Draw and Interpret Frequency Polygons - Be able to plot a frequency polygon when given a table. - Be able to interpret a frequency polygon.			
Lesson 7: Drawing Pie Charts - Be able to calculate the degrees for each category. - Be able to construct a pie chart.				Lesson 8: Interpreting Pie Charts Be able to read values from a pie chart.			
Lesson 9: Consolidation lesson - Consolidation on all work covered so far on the topic. - Long periods of deliberate practice. - Should contain exam questions				Lesson 10: Plotting Time Series Graphs Be able to construct axis and plot a time series graph.			
Lesson 11: Interpreting Time Series Graphs - Be able to identify increases, decreases, and constant periods. - Be able to compare values at different times. - Be able to describe trends ("the temperature rose steadily after midday"). - Be able to estimate values between points (interpolation). - Understand that predictions beyond the data are estimates (extrapolation)..				Lesson 12: Drawing Scatter Graphs - Be able to construct axis. - Be able to plot points accurately. - Be able to draw a line of best fit (LOBF).			
Lesson 13: Interpreting Scatter Graphs - Be able to describe the relationship and correlation. - use a LOBF to estimate values. - Be able to use a LOBF to predict values outside the data set.				Lesson 14: Comparing Data Be able to compare two sets of data and interpret in context.			
Lesson 15: Appropriate Diagrams to Display Data and Misleading Graphs Be able to decide the most suitable diagram for a data set				Lesson 16: Revision Lesson - Teacher assess topics the class need to revise. - Classroom based or Mathswatch			
Lesson 17: Assessment Lesson - Do 10-minute top up and go through answers together, students self-assess. - Open book assessment done in silence.				Lesson 18: Feedback Lesson - Student to highlight their traffic light sheet. - Teacher to go through test and students to self-assess in green. - Students to complete the NOW section of the WOW-HOW-NOW sheet.			

Key Vocabulary

Average	Discrete	Continuous	Qualitative	Quantitative	Data	Anomaly	Correlation
Sample	Population	Outlier	Mean	Interpolation	Extrapolation	Median	Mode

How will this help you in the future?

KS4

- **Statistics** is a key GCSE topic and regularly appears on both Foundation and Higher GCSE papers.
- You'll learn how to calculate and interpret **averages** (mean, median, mode and range), helping you answer exam questions accurately and choose the most appropriate measure for different situations.
- Working with **frequency tables** and **grouped data** develops the skills needed for more challenging GCSE statistics questions.
- **Two-way tables** strengthen problem-solving skills and prepare you for probability and data-handling questions.
- Drawing and interpreting **statistical diagrams** (including stem-and-leaf diagrams, frequency polygons, pie charts, time series and scatter graphs) helps you present and analyse data, a common GCSE requirement.
- **Scatter graphs** and lines of best fit introduce correlation, estimation and prediction, which are assessed in GCSE exams.
- **Comparing data** sets teaches you how to justify conclusions using statistical evidence rather than opinion.
- Choosing the most appropriate **graph and recognising misleading** graphs develops critical thinking and helps you interpret real-life data confidently.
- These skills are also useful **beyond GCSE Maths**, supporting subjects such as Science, Geography, Business and Psychology, where data analysis and interpretation are essential.

Beyond LHS

- **Understanding data and statistics** helps you make informed decisions in everyday life, from comparing products to understanding news reports and surveys.
- **Calculating averages and interpreting data** is useful in many careers, including business, healthcare, engineering, finance, sport and science.
- **Reading and creating graphs and charts** helps you communicate information clearly and understand reports in the workplace.
- **Two-way tables and frequency tables** develop organisational and analytical skills that are valuable in office, retail and technical roles.
- **Scatter graphs and trends** help you identify patterns and make predictions, skills that are widely used in business, economics and scientific research.
- **Comparing data and spotting misleading graphs** helps you think critically about information shared in the media, advertising and social media.
- **Presenting data accurately** is an important skill in many jobs, where reports and presentations are used to support decisions.
- **Developing problem-solving and logical thinking** through statistics prepares you for further study, apprenticeships and employment.
- **Confidence with data** makes it easier to manage personal finances, understand bills, compare deals and make evidence-based decisions throughout adult life.
- **These statistical skills are highly transferable**, making them valuable in almost every career and helping you become a more informed and confident citizen.



How does this unit link to prior learning?

- Recognise special types of triangles and quadrilaterals.
- Recall basic angle facts (right angle, straight line, triangles, vertically opposite angles, around a point).
- Name polygons and understand the meaning of 'regular polygon'.
- Substitute numbers into an expression.
- Recall square numbers and square roots.
- Identify the hypotenuse.
- Identify the opposite and adjacent sides of a given angle in right-angled triangles.

Prior Knowledge Check

- 1) What do angles around a point add up to?
- 2) What do angles on a straight line add up to?
- 3) What do you know about vertically opposite angles?
- 4) Can you name and describe the key features of:

a) An isosceles triangle
b) A Parallelogram
- 5) Write down the value of $\sqrt{36}$

What will you be learning about?

- To be able to find missing angles in triangles, quadrilaterals, parallel lines and polygons.
- To use Pythagoras' Theorem to find missing sides in right angled triangles.
- To use Trigonometry to find missing sides and angles in right angled triangles

How does this link to the wider curriculum?

- The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

1. Basic Angles Recap

- Be able to identify topics coming up in this unit.
- Be able to recall and use basic angle rules: straight line, around a point, vertically opposite and communicate reasons.

RAG

2. Angle Properties of Triangles and Quadrilaterals

- Be able to derive and use the sum of angles in a triangle and in a quadrilateral.
- Be able to derive and use the fact that the exterior angle of a triangle is equal to the sum of the two opposite interior angles.

RAG

3. Interior Angles in Polygons - Calculate the sum of the interior angles of a polygon. - Use the interior angles of polygons to solve problems.				4. Exterior Angles in Polygons - Know and apply the sum of the exterior angles of a polygon. - Use the angles of polygons to solve problems.			
5. Angles in Parallel Lines Be able to calculate angles in parallel lines using reasoning to support working. Including alternate, corresponding and co-interior angles.				6. Consolidation Lesson - Consolidation on all work covered so far on the topic. - Long periods of deliberate practice. - Should contain exam questions.			
7. Pythagoras' Theorem 2 (Finding Longer) Side - Be able to calculate the length of the hypotenuse in a right-angled triangle. - Solve problems using Pythagoras' Theorem.				8. Pythagoras' Theorem 2 (Finding Shorter Side) - Be able to calculate the length of a shorter side in a right-angled triangle. - Solve problems using Pythagoras' Theorem. - Apply Pythagoras' theorem to 3D problems.			
9. Trigonometry 1 (Missing Sides) - Be able to identify and label sides in a right-angled triangle. - Use trigonometric ratios to find lengths in a right-angled triangle. - Use trigonometric ratios to solve problems.				10. Trigonometry 1 (Missing Angles) - Be able to use trigonometric ratios to calculate an angle in a right-angled triangle. - Find angles of elevation and angles of depression - Apply trigonometric ratios to 3D problems.			
11. Exact Trigonometric Ratios Know and apply the exact values of the sine, cosine and tangent of 0°, 30°, 45°, 60°, 90°.				12. Revision Lesson - Teacher assess topics the class need to revise. - Classroom based or Mathswatch.			
13. Assessment Lesson - Do 10-minute top up and go through answers together, students self-assess. - Open book assessment done in silence.				14. Feedback Lesson - Students to highlight their traffic light sheet. - Teacher to go through test and students to self-assess in green. - Students to complete the NOW section of the WOW-HOW-NOW sheet.			
Key Vocabulary							
Quadrilateral	Parallel	Corresponding	Alternate	Co-interior	Hypotenuse	Polygon	

How will this help you in the future?	
KS4 - Revisiting angle facts, parallel line rules, and polygon angle properties prepares students for the GCSE geometry questions that rely heavily on these fundamentals. - KS4 exam questions assume instant recall of these facts—this unit ensures students already have them secure. - Pythagoras' Theorem and right-angle trigonometry feature in every GCSE paper. - Recognising relationships between sides/angles prepares pupils for formula rearrangement later. - Vocabulary such as <i>corresponding</i>, <i>alternate</i>, <i>co-interior</i>, <i>interior/exterior angle</i>, <i>hypotenuse</i>, <i>opposite</i>, <i>adjacent</i>, <i>ratio</i> builds the precision needed for 4–5 mark reasoning questions at GCSE. KS4 mark schemes reward correct terminology—this unit embeds it early. - Trigonometric ratios (sin, cos, tan) are introduced explicitly—this directly links to later work on: - Bearings - Elevation/depression - Non right-angled trigonometry (sine rule & cosine rule) - Vectors - You'll go into KS4 already confident with angle rules, parallel lines and polygons — things GCSE questions expect you to know straight away. - You'll practise putting numbers into formulas and working things out carefully, which helps a lot with GCSE algebra questions too. - You won't just learn the rules — you use them to answer multistep questions, just like the ones you'll meet in your GCSEs. - Establishes transferable skills applicable across KS4 maths e.g., Logical reasoning, diagram interpretation and applying formulas consistently, Using mathematical notation. These skills are required not only in geometry but across algebra, proportion, and problem-solving units at GCSE.	Beyond LHS You learn to solve real-life problems - Figuring out missing lengths, heights and angles is something people genuinely use in building, engineering, design, architecture, DIY and more. - This unit trains you to think logically and break problems into steps — an important skill in every job. You get better at using formulas — a key workplace skill - Many jobs use formulas daily (e.g., electricians, mechanics, nurses, engineers, computer technicians). - Practising Pythagoras and trigonometry help you get comfortable choosing and using the right formula carefully. You build confidence with diagrams, plans and measurements - Lots of careers involve reading plans or interpreting diagrams: - Architecture - Joinery - Engineering - Graphic design - Working with shapes, angles and lengths helps you prepare for these. You practise working carefully and checking your accuracy - In many careers, mistakes cost time or money. - This unit trains you to: - Show working - Check calculations - Use feedback - Fix errors - These habits are vital in jobs involving money, measurement, data, safety or planning. You prepare for careers in STEM Trigonometry and Pythagoras are used in careers such as: - Engineering (civil, mechanical, electrical) - Surveying - Architecture - Aviation and navigation - Computer graphics and game design - Robotics. You become better at thinking for yourself - This unit doesn't just teach facts — it makes you reason, justify, explain and apply ideas. - Independent thinking helps with: - making decisions - solving real-life problems - budgeting and planning - understanding how the world works



How does this unit link to prior learning?

- Rearrange equations.
- Read values from graphs.
- Be able to solve using substitution.
- Find speed from given distance and time.
- Find the area of triangles and rectangles.
- Identify quadratic expressions.
- Know the shape of linear and quadratic graphs.
- Match the shape of a container to the graph of depth of water against time.

Prior Knowledge Check

1) When $x = 8$, what is the value of:

$5x$

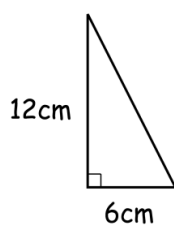
$4x + 2$

x^2

2) Make x the subject

$y + 2x = 4$

3) A car drives 120 miles in 3 hours. Calculate the average speed, in mph, of the car.



4) Work out the area of this triangle.

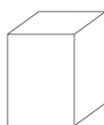
5)

Three containers are filled with water that is poured at a constant rate.

Container A



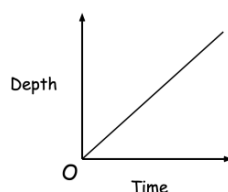
Container B



Container C



The graph shows the depth of water in one of the containers as it is filled.



(a) Which container does the graph above represent?

Container.....
...

What will you be learning about?		How does this link to the wider curriculum?	
• Use $y = mx + c$ to find the gradient and y-intercept and plot them. • Find the equation of a line from a graph or coordinates. • Draw and use other types of graphs.		• The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.	
We will develop our learning each week by focusing on:			
1. Coordinates Recap • Be able to plot coordinates	RAG	2. Plotting Straight Line Graphs • Rearrange an equation into the form $y = mx + c$. • Plot graphs with equations $ax + by = c$. • Sketch graphs using the gradient and intercepts.	RAG
3. Interpreting Straight Line Graphs • Find the gradient and y-intercept from a linear equation. • Find the equation of a line, given its gradient and one point on the line. • Find the gradient of a line through two points.		4. Line Segments • Find the coordinates of the midpoint of a line segment. • Find the gradient and length of a line segment.	
5. Parallel/Perpendicular Lines • Find the equations of lines parallel or perpendicular to a given line.		6. Consolidation Lesson • Consolidation on all work covered so far on the topic. • Long periods of deliberate practice. • Should contain exam questions.	
7. Plotting Quadratic Graphs • Draw quadratic graphs.		8. Interpreting Quadratic Graphs • Solve quadratic equations using graphs. • Identify the line of symmetry of a quadratic graph including the turning point & y intercept. • Interpret quadratic graphs relating to real-life situations.	
9. Plotting Cubic and Reciprocal Graphs • Draw graphs of cubic functions. • Draw graphs of reciprocal functions.		10. Interpreting Cubic and Reciprocal Graphs • Solve cubic equations using graphs. • Recognise a graph from its shape.	
11. Real Life Graphs • Draw & interpret real-life linear graphs. • Recognise direct proportion. • Draw and use a line of best fit.		12. Drawing Distance/Time Graphs • Draw distance–time graphs.	
13. Interpreting Distance/Time Graphs • Calculate average speed from a distance–time graph.		14. Drawing Velocity/Time Graphs • Draw velocity–time graph.	
15. Interpreting Velocity/Time Graphs • Find acceleration and distance from velocity–time graph.		16. Graph of A Circle • Be able to draw the graph of a circle.	
17. Revision Lesson • Teacher assess the topics the class need to revise. • Classroom based or Mathswatch.		18. Assessment Lesson (calculator) • Do 10-minute top up and go through answers together, students self-assess. • Open book assessment done in silence.	

19. Feedback Lesson • Student to highlight their traffic light sheet. • Teacher to go through test and students to self-assess in green. • Complete the NOW section of the WOW-HOW-NOW sheet.						
Key Vocabulary						
Gradient	Parallel	Perpendicular	Quadratic	Cubic	Reciprocal	Velocity
How will this help you in the future?						
KS4			Beyond LHS			
You build the foundations needed for GCSE Maths success • Plotting coordinates and drawing graphs at KS3 prepares students for GCSE graph work. • Develops confidence with algebra and interpreting mathematical relationships. • Supports understanding of equations and graphical problem solving at KS4.			You learn to use graphs to understand real-life situations • Graphs help people see patterns, trends and relationships between different things such as distance, time, speed, cost or profit. These skills are used in careers like engineering, business, science, transport planning and data analysis. • You develop skills in locating and mapping. • Plotting coordinates is used whenever accurate locations are needed, such as in GPS systems, digital maps, architecture plans & computer game design. • Careers that use coordinate systems include: ○ Engineering and Architecture ○ Navigation and Aviation ○ Game development • Learning coordinates helps you understand how positions are communicated accurately.			
You prepare for solving equations graphically at KS4 • Straight line graphs lead to solving simultaneous equations at GCSE. • Helps students understand where graphs intersect to find solutions. • Links directly to GCSE exam questions involving graphical methods.			You learn how relationships can be modelled • Straight line graphs show how one thing changes compared to another, such as pay overtime, fuel usage or business costs. • Careers relying on understanding these relationships include: ○ Data analysis ○ Finance and business ○ Science and research ○ Computer programming • This unit builds your ability to recognise patterns and make predictions.			
You develop algebra skills needed for problem solving • Rearranging equations into $y = mx + c$ strengthens algebra skills. • Supports KS4 topics such as linear equations, functions and sequences. • Builds confidence manipulating formulas and expressions.			You practise analysing real data and making predictions • Drawing lines of best fit and interpreting real-life graphs helps professionals make decisions using data. • Careers that rely on this include: ○ Market research ○ Weather forecasting ○ Healthcare research ○ Business management • This unit strengthens decision-making using evidence.			
You develop algebra skills needed for problem solving • Rearranging equations into $y = mx + c$ strengthens algebra skills. • Supports KS4 topics such as linear equations, functions and sequences. • Builds confidence manipulating formulas and expressions.						
You prepare for GCSE coordinate geometry • Midpoints, gradients and line segments form the basis of KS4 coordinate geometry. • Supports geometric reasoning and problem solving on graphs. • Helps students understand relationships between lines and shapes.						
You develop knowledge needed for quadratic functions at GCSE • Plotting quadratic graphs introduces symmetry and turning points. • Leads into solving quadratic equations at KS4. • Supports Higher Tier GCSE algebra topics.						
You develop mathematical reasoning required at KS4 • Practising clear working and logical steps. • Checking answers and correcting mistakes. • Building problem-solving skills needed for GCSE examinations.						



How does this unit link to prior learning?

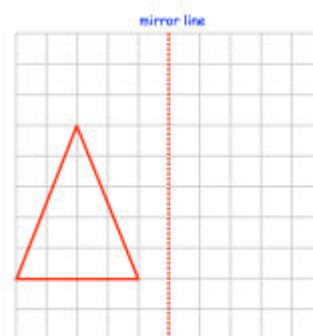
- Convert metric units of length
- Reflect over a mirror line
- Use a compass
- Use a ruler

Prior Knowledge Check

1) Complete a) $1\text{m} = \dots\dots\dots\text{cm}$ b) $1\text{km} = \dots\dots\dots\text{m}$ c) $1\text{km} = \dots\dots\dots\text{cm}$

2) What are the three rules for bearings?

3) Reflect the triangle in the mirror line:



What will you be learning about?

How does this link to the wider curriculum?

- To apply and describe transformations including translations, reflections, rotations and enlargements.
- Perform constructions using a compass and protractor.
- To understand and use bearings to solve problems and to solve problems using bearings and loci.

- The five British values are embedded in maths lessons through collaborative problem-solving, mutually respecting discussions of different methods, following classroom rules, making independent choices and appreciating diverse perspectives and contributions.

We will develop our learning each week by focusing on:

1. Reflection • Reflect a 2D shape in a mirror line. • Describe reflections.	RAG	2. Rotation • Rotate a 2D shape about a centre of rotation. • Describe rotations.	RAG
3. Translation • Translate a shape using a vector.		4. Enlargement • Enlarge shapes by fractional and negative scale factors about a centre of enlargement.	
5. Combinations of transformations • Carry out and describe combinations of transformations.		6. Plans and Elevations • Draw plans and elevations of 3D solids	
7. Consolidation Lesson • Consolidation on all work covered so far on the topic. • Long periods of deliberate practice. • Should contain exam questions.		8. Constructing Triangles • Construct triangles using a ruler and compasses. • SAS, ASA, SSS Triangles (this may need 2 lessons)	
9. Constructions • Construct the perpendicular bisector of a line. • Construct the shortest distance from a point to a line using a ruler and compasses. • Bisect an angle using a ruler and compasses.		10. Bearings • Read and draw bearings. • Solve problems involving bearings.	

- Construct angles using a ruler and compasses. - Construct shapes made from triangles using a ruler and compasses. (this may need two lessons)			
11. Scale Drawings - Create and interpret scale drawings. - Draw and use map scales.		12. Loci - Rules - Draw a locus. - Understand loci rules.	
13. Loci – Problems Mixed problems involving Loci.		14. Revision Lesson - Teacher assess the topics the class need to revise. - Classroom based or Mathswatch.	
15. Assessment Lesson (calculator) - Do 10-minute top up and go through answers together, students self-assess. - Open book assessment done in silence.		16. Feedback Lesson - Student to highlight their traffic light sheet. - Teacher to go through test and students to self-assess in green. - Complete the NOW section of the WOW-HOW-NOW sheet.	

Key Vocabulary

Transformation	Rotation	Loci	Enlargement	Reflection	Bearings	Construct	Vertex	Translation	Bisect
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How will this help you in the future?

KS4	Beyond LHS
You build the foundations for GCSE transformation geometry - Students develop accuracy using mathematical language to describe transformations. - Supports GCSE topics on congruence, similarity and geometric reasoning. You strengthen coordinate and vector understanding - Translations using vectors prepare students for KS4 vector problems. - Supports algebraic and geometric reasoning required at GCSE. You develop multi-step problem-solving skills - Combining transformations helps students tackle more complex GCSE exam questions. - Encourages students to explain reasoning and follow logical processes carefully. You build the accuracy needed for GCSE constructions - Directly supports GCSE construction and loci topics. - Encourages careful measuring and methodical working. You prepare for loci and geometric reasoning at KS4 - Loci rules and problems build logical thinking and interpretation skills. - Supports higher-level geometry questions involving distance and regions.	You build spatial awareness used in technical careers - These are important in careers such as: - Architecture, Engineering, Graphic design, Animation and game design - Understanding how shapes move and change is essential in design-based industries. You learn how scale & enlargement and 3D designs are used in real life - Enlargements and scale drawings are used whenever real objects are represented smaller or larger. - Careers that use scale include: - Architects, Interior designers, Cartographers (map makers), Product designers, Construction, Mechanical engineering, CAD design. You develop practical drawing and construction skills - Using rulers and compasses mirrors the accuracy needed in technical professions. - These skills are used in: - Engineering, Joinery, Architecture, Product design. You learn navigation and direction skills through bearings - Bearings are used in navigation and route planning. - Careers that use bearings include: - Pilots, Ship navigators, Military personnel, Surveyors.