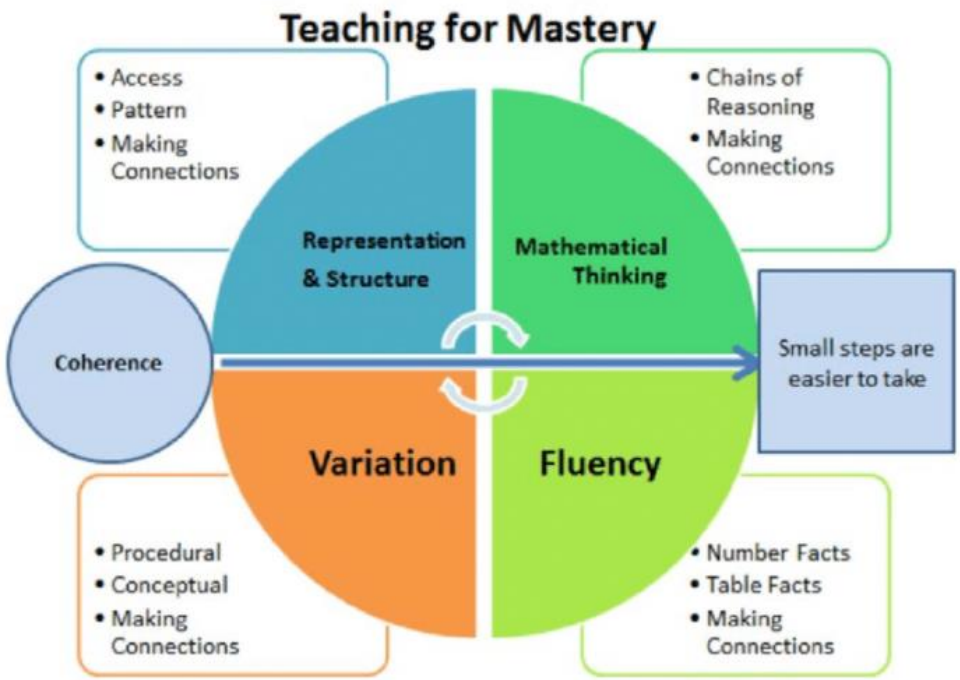
Lord Derby Academy



Curriculum Handbook 2022-2023

Mathematics

The Curriculum at LDA is underpinned by the **Dean Trust Curriculum Values**

Mathematics Statement of Intent

We believe that pupils deserve a creative and ambitious mathematics curriculum, rich in skills and knowledge, which ignites curiosity and prepares them well for everyday life and future employment.

Contents:

The National Curriculum
Key Stage 2: Mathematics

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Pupils should be taught to:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions
- develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers
- be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages
- solve a range of problems, including with simple fractions and decimal place value
- increase accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them
- use measuring instruments with accuracy and make connections between measure and number
- memorise their multiplication tables up to and including the 12-multiplication table and show precision and fluency in their work
- read and spell mathematical vocabulary correctly and confidently
- learn the basic language of algebra as a means for solving a variety of problems
- classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them
- read, spell and pronounce mathematical vocabulary correctly

Key Stage 3: Mathematics

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programme of study for Key Stage 3 is organised into apparently distinct domains, but pupils should build on Key Stage 2 and connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge in science, geography, computing and other subjects. Decisions about progression should be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content in preparation for Key Stage 4. Those who are not sufficiently fluent should consolidate their understanding, including through additional practice, before moving on. Pupils should be taught:

Develop fluency

- consolidate their numerical and mathematical capability from Key Stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots
- select and use appropriate calculation strategies to solve increasingly complex problems
- use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
- substitute values in expressions, rearrange and simplify expressions, and solve equations
- move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]
- develop algebraic and graphical fluency, including understanding linear and simple quadratic functions
- use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics

Reason mathematically

- extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations
- extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically
- identify variables and express relations between variables algebraically and graphically
- make and test conjectures about patterns and relationships; look for proofs or counterexamples
- begin to reason deductively in geometry, number and algebra, including using geometrical constructions
- interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning
- explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally

Solve problems

- develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems
- develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics
- begin to model situations mathematically and express the results using a range of formal mathematical representations
- select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems

LDA Mathematics Curriculum Aims

Mathematics is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

The Mathematics curriculum at Lord Derby Academy (LDA) builds on the National Curriculum. We aim to **develop fluency** in the fundamentals of mathematics, including through varied and frequent "intelligent practice" with increasingly complex problems over time, so that pupils develop the ability to recall and apply knowledge rapidly and accurately as well as conceptual understanding.

We are also striving to allow pupils to **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, develop mathematical arguments and proofs and make conclusions based on logical inferences. Our intention is also for pupils to **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions. As such, resilience is a crucial skill that we will be cultivating in pupils. Equally important is our focus on developing pupils' ability to verbalise their thoughts. We have imported from our visit to Shanghai classrooms the mantra: "the answer is only the beginning", which, we believe, supports the development of talk and helps the teacher gain access to pupils' reasoning.

Pupils also need to be able to utilise technology effectively, such as scientific calculators, to perform increasingly complex problems (as well as having strong written and mental mathematical skills, not instead of). As the repertoire of mathematical skills that pupils possess grows, they become more able to solve increasingly more complex problems. They are more able to apply mathematics to model real life situations.

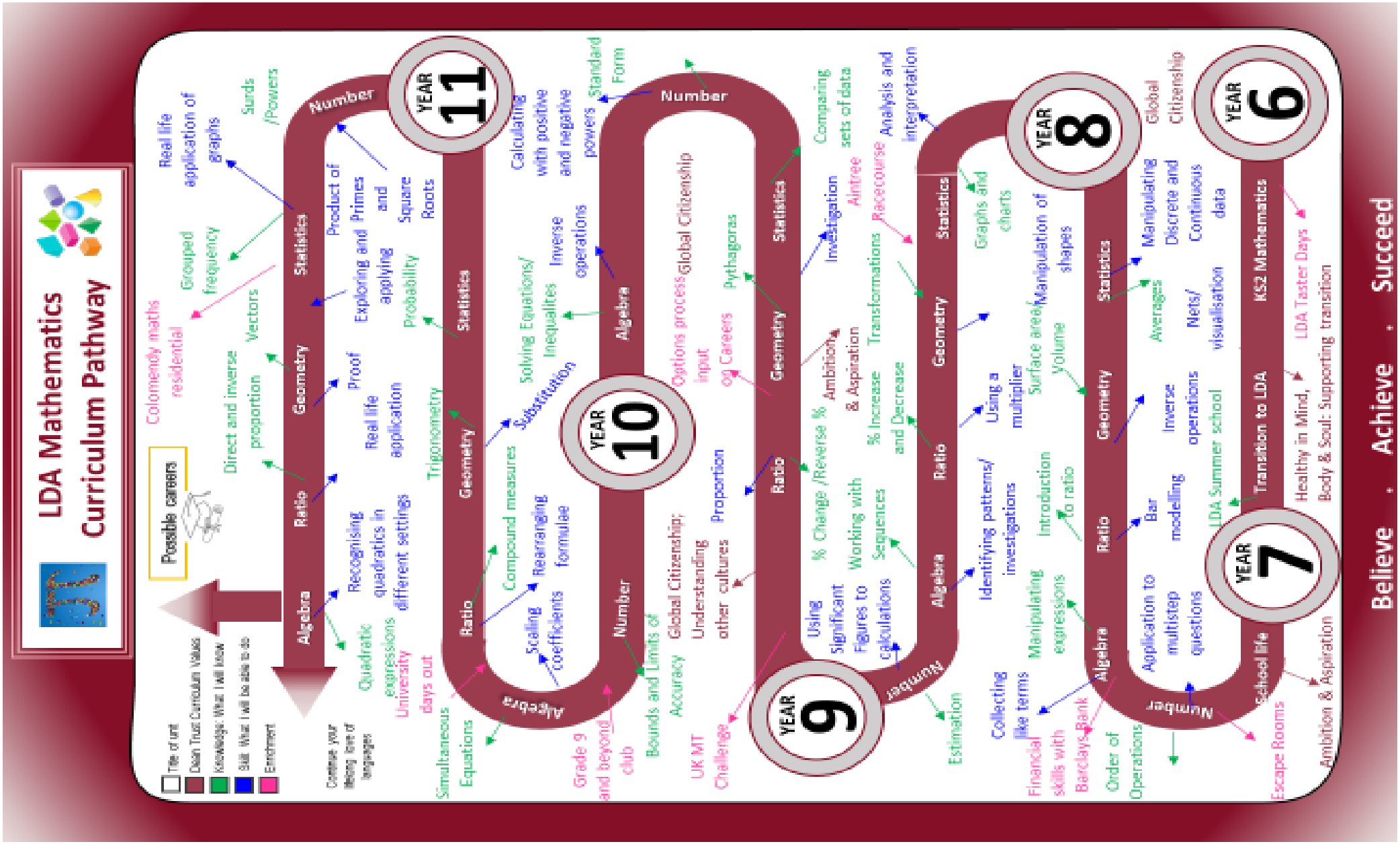
At key stage 3, we promote equity by working through the breadth of the curriculum with all pupils so that they can achieve regardless of their starting point. We run a number of KS3 Mathematics clubs and enrichment activities (Young engineers of the future club, LDA Kahoot Quizzes, financial skills workshops etc). We develop our highest attaining pupils through depth and more challenging problem solving, rather than through acceleration of content. These pupils can also enhance their mathematical skills and knowledge through various clubs and enrichment activities such as our A Level Maths club, the "Maths Circle" initiative for High achievers in Key Stage 3, access to the University of Liverpool Maths School's online sessions to deepen understanding of Maths, trips to the University of Liverpool Maths School, the Maths Feast competition - a fun educational challenge for Year 10 students that tests problem-solving and teamwork skills. Pupils are also invited to take part in the annual Mathematical Education on Merseyside (MEM) competition.

We intend for a high proportion of our pupils to go on and study or use mathematics in some form post-16; this means that our key stage 4 curriculum needs to be broad enough to cater for pupils who will go on to study maths at the highest level. Ultimately, the intention of our mathematics curriculum is to provide pupils with the necessary thinking skills and content to be successful in their next stage of life or education. Nationally, there are huge shortfalls in job applicants with strong STEM skills. Occupations in the STEM sector are growing at a rate that is nearly double other sectors. Our intention is to develop pupils' abilities sufficiently so that they are able to rise to the challenging opportunities this sector has to offer.

LDA Mathematics Curriculum Model 2021-2022

In year 7 and 8 pupils will experience 5 lessons of Mathematics and one lesson of Numeracy per week. In year 9 pupils will experience 4 lessons of Mathematics and one lesson of Numeracy per week. At KS4 Pupils are taught 5 lessons of Mathematics and 1 Extra Maths lesson per week. Numeracy and Extra Maths sessions are aimed at supporting early intervention to bridge gaps in knowledge and skill due to the pandemic and other social economic barriers. During the options process in Year 9, we strive to encourage pupils to study Statistics to GCSE.

	KEY STAGE 2	KEY STAGE 3			KEY STAGE 4	
	Year 6	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Year 11**
NO. OF LESSONS PER WEEK	11/11 Named Partner Primary schools study Mathematics at KS2 and follow the National Curriculum. *Options subjects	**4x 50 minutes** ***Mathematics***	**4 x 50 minutes** ***Mathematics***	**5 x 50 minutes** ***Mathematics***	**5 x 50 minutes** ***Mathematics*** **3 x 50 minutes** ***Statistics ******	**5 x 50 minutes** ***Mathematics*** ***1X50 minutes Extra Maths*** **3 x 50 minutes** ***Statistics ******


LDA Mathematics
Curriculum Pathway
Possible careers
Title of unit
Dean Trust Curriculum Values
Knowledge: What I will know
Skill: What I will be able to do
Enrichment
Continue your lifelong love of languages
YEAR 11
Number
Statistics
Geometry
Ratio
Algebra
Real life application of graphs
Surds /Powers
Colomendy maths residential
Grouped frequency
Vectors
Direct and inverse proportion
Product of Primes
Exploring and applying
Proof
Real life application
Recognising quadratics in different settings
Quadratic expressions
University days out
Probability
Square Roots
Trigonometry
Simultaneous Equations
YEAR 10
Calculating with positive and negative powers
Standard Form
Solving Equations/ Inequalities
Inverse operations
Substitution
Compound measures
Rearranging formulae
Scaling coefficients
Options process
Global Citizenship
Input on Careers
Pythagoras
Grade 9 and beyond club
Bounds and Limits of Accuracy
Global Citizenship; Understanding other cultures
Proportion
UK MT Challenge
YEAR 9
Comparing sets of data
Investigation
Ambition & Aspiration
Analysis and interpretation
Racecourse
Transformations
% Increase and Decrease
% Change /Reverse %
Using significant figures to calculations
Working with Sequences
Estimation
Collecting like terms
Manipulating expressions
Identifying patterns/ investigations
Introduction to ratio
Financial skills with Barclays Bank
Order of Operations
YEAR 8
Global Citizenship
Graphs and charts
Manipulation of shapes
Surface area/ Volume
Using a multiplier
Manipulating Discrete and Continuous data
Averages
Nets/ visualisation
Inverse operations
Bar modelling
Application to multistep questions
YEAR 7
Transition to LDA
KS2 Mathematics
LDA Taster Days
Healthy in Mind,
Body & Soul: Supporting transition
LDA Summer school
School life
Escape Rooms
Ambition & Aspiration
Believe . Achieve . Succeed

Key Stage 3 Overview

Key Stage 3 Overview

Year 7

Rationale: At the start of Year 7, pupil will continue to build on KS2 knowledge and develop their own strategies for solving problems with or without ICT, they will check their results are reasonable by considering the context. Pupils will be encouraged to look for patterns and relationships, presenting information and results in a clear and organised way. They will search for a solution by trying out ideas of their own. Pupils will use their understanding of place value to mentally multiply and divide whole numbers by powers of ten. They will apply efficient strategies for addition, subtraction, multiplication and division and recognise approximate proportions of a whole. Pupils will use simple fractions and percentages to describe proportion and begin to use simple formulae expressed in words. They will choose and use appropriate units and tools, interpreting, with appropriate accuracy, numbers on a range of measuring instruments. They will be able to find areas of simple and compound shapes. Pupils will generate and answer questions that require the collection of discrete data. They will understand and use an average and range to describe sets of data. Pupils will be able to construct and interpret simple line graphs.

Year 8

Rationale: Pupils will explore mathematical situations, carry out tasks or tackle problems, they will identify the mathematical aspects and obtain necessary information in order to calculate accurately, using ICT where appropriate. They will demonstrate understanding of situations by describing them mathematically using symbols, words and diagrams and draw simple conclusions of their own whilst explaining their reasoning. Pupils will be able to solve simple problems involving ratio and direct proportion and will be able to calculate fractional or percentage parts of quantities and measurements, using a calculator where appropriate. Pupils will be able to measure and draw angles to the nearest degree and use language associated with angles. They will learn about the angle sum of a triangle and that of angles at a point. They understand and use the formula for the area of a rectangle to help them make connections to the are formulae of other 2D shapes. Pupils will understand and use the mean of discrete data when comparing two simple distributions using the range and one of the following: mode, median or mean. They will interpret graphs and diagrams, including pie charts, and draw conclusions. They will understand and use the probability scale from 0 to 1 and be able to find and justify probabilities and approximations to these by selecting and using methods based on equally likely outcomes and experimental evidence, as appropriate.

Year 9

Rationale: In year 9 pupils will solve increasingly complex problems by independently and systematically breaking them down into smaller, more manageable tasks. They will interpret, discuss and synthesise information presented in a variety of mathematical forms, relating findings to the original context. Their written and spoken language will explain and inform their use of diagrams. Pupils will be encouraged to order and approximate decimals when solving numerical problems and equations, using trial and improvement methods. They will evaluate one number as a fraction or percentage of another and understand and use the equivalences between fractions, decimals and percentages to calculate ratios in appropriate situations. Pupils will find and describe in words the rule for the next term or nth term of a sequence where the rule is linear. They will formulate and solve linear equations with whole-number coefficients. Pupils will move on to representing mappings expressed algebraically and use Cartesian coordinates for graphical representation interpreting general features. Pupils will understand and use appropriate formulae for finding circumferences and areas of circles, areas of plane rectilinear figures and volumes of cuboids when solving problems. From a statistics point of view, pupils will be able to collect and record continuous data, choosing appropriate equal class intervals over a sensible range to create frequency tables. They will construct and interpret frequency diagrams, pie charts, scatter diagrams, and have a basic understanding of correlation.

Key Stage 3 Overview	KS3 Module 1: *(Year 7 Module 1–6 start date W.C. 1.9.21)*	KS3 Module 2: *(Year 7 Module2–6 start date W.C. 1.10.21)*	KS3 Module 3: *(Year 7 Module 3– 6 start date W.C. 5.1.22)*
	Knowledge *What pupils will know*	**Knowledge *What pupils will know***	**Knowledge *What pupils will know***
	Number • Four operations (including BIDMAS) • Powers and Roots • KTC10: Directed Number Algebra • Simplify and manipulate algebraic expressions • Understand equivalence • Order of operations • Substitution into formulae and expressions, including scientific formulae	Geometry and Measure • Area, perimeter, including compound shapes Number • Place value • Rounding and estimation • Four operations (Decimals) • Units of measure	Collecting data • Averages • Charts, tables and diagrams Number • Factors, Multiples, Primes • Equivalence and ordering of fractions, decimals and percentages • Four operations (Fractions) • Percentages • Percentage problems
	Skill *What pupils will be able to do*	**Skill *What pupils will be able to do***	**Skill *What pupils will be able to do***
	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills

Key Stage 3 Overview	KS3 Module 4: *(Year 7 Module 4 of 6 – start date W.C. 28.3.22)*	KS3 Module 5: *(Year 7 Module 5 of 6 – start date W.C. 25.4.22)*	KS3 Module 6: *(Year 7 Module 6 of 6 – start date W.C. 6.6.22)*
	Knowledge *What pupils will know*	**Knowledge *What pupils will know***	**Knowledge *What pupils will know***
	Solving Equations • Form/solve expressions and equations Sequences • Generate terms of a sequence and understand when a term is, or is not, part of a sequence • Angle facts	Ratio • Scale drawings • Ratio notation • Equivalent ratios and fractions Proportion • Direct and inverse proportion • 3D Shapes and Volume	Algebra • Coordinates in all four quadrants • Draw a linear graph Probability • Exhaustive probabilities • Single event probability • Diagrams to calculate probabilities • And /Or Rule • Single and combined transformations
	Skill *What pupils will be able to do*	**Skill *What pupils will be able to do***	**Skill *What pupils will be able to do***
	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills

Key Stage 3 Overview	KS3 Module 7: *(Year 8 Module 1–6 start date W.C. 1.9.21)*	KS3 Module 8: *(Year 8 Module2–6 start date W.C. 1.10.21)*	KS3 Module 9: *(Year 8 Module 3– 6 start date W.C. 5.1.22)*
	Knowledge *What pupils will know*	**Knowledge *What pupils will know***	**Knowledge *What pupils will know***
	Number • Directed number • Powers, Factors, Multiples, Primes and Roots • Indices (index rules) • Equivalence and ordering of fractions, decimals and percentages • Four operations (F,D,P) • Percentages • Percentage problems • Four operations (BIDMAS)	Algebra • Substitution into formulae and expressions, including scientific formulae • Plot coordinates in all four quadrants • Draw a linear graph • Real life graphs • Quadratic, cubic and reciprocal graphs • Generate terms of a sequence and understand when a term is, or is not, part of a sequence • nth term of a linear sequence	Ratio and Proportion • Scale drawings • Ratio notation • Equivalent ratios and fractions • Direct and inverse proportion Algebra • Understand equivalence • Form/solve expressions and equations • Simplify and manipulate algebraic expressions • Inequalities and number lines • Solving Inequalities (linear)
	Skill *What pupils will be able to do*	**Skill *What pupils will be able to do***	**Skill *What pupils will be able to do***
	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills

	KS3 Module 10: *(Year 8 Module 4 of 6 – start date W.C. 28.3.22)*	KS3 Module 11: *(Year 8 Module 5 of 6 – start date W.C. 25.4.22)*	KS3 Module 12: *(Year 8 Module 6 of 6 – start date W.C. 6.6.22)*
	Knowledge *What pupils will know*	**Knowledge *What pupils will know***	**Knowledge *What pupils will know***
Key Stage 3 Overview	Geometry and Measure • Angle facts Transformations • Single and combined transformations • Translation using 2D vectors • Use column representation of vectors Similarity • Similar Shapes (lengths only)	Integers, Negative numbers, Decimals • Place value • Rounding and estimation Area, Perimeter and Volume • Units of measure • Area, perimeter and volume, including compound shapes • Problems involving area, perimeter and volume (including money problems)	Geometry and Measure • Ruler and Compass constructions Data • Charts, tables and diagrams • Compare data sets • Averages Probability • Exhaustive probabilities • Single event probability • Diagrams to calculate probabilities • And /Or Rule
	Skill *What pupils will be able to do*	**Skill *What pupils will be able to do***	**Skill *What pupils will be able to do***
	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills

	KS3 Module 13: *(Year 9 Module 1–6 start date W.C. 1.9.21)*	KS3 Module 14: *(Year 9 Module2–6 start date W.C. 1.10.21)*	KS3 Module 15: *(Year 9 Module 3– 6 start date W.C. 5.1.22)*
	Knowledge *What pupils will know*	**Knowledge *What pupils will know***	**Knowledge *What pupils will know***
	Number • Directed number • Powers, Factors, Multiples, Primes and Roots • Indices (index rules) • Standard Form Algebra • Form/solve expressions and equations • Change the subject of the formulae • Substitution into formulae and expressions, including scientific formulae • Plot coordinates in all four quadrants	Algebra • Draw and interpret a linear graph • Real life graphs • Quadratic, cubic and reciprocal graphs • Gradients, y intercept and the equation of a line (y=mx + c) • Inequalities and number lines • Interpret inequalities (values represented by an inequality) • Solving Inequalities (linear) • Simultaneous Equations (linear)	Geometry and Measure • Angle facts (including angles in parallel lines) • Interior and Exterior angles of polygons (including regular polygons) • Bearings Algebra • Generate terms of a sequence and understand when a term is, or is not, part of a sequence • nth term of a linear sequence Data • Charts, tables and diagrams Number • Percentages • Percentage problems • Compound Interest and Depreciation
	Skill *What pupils will be able to do*	**Skill *What pupils will be able to do***	**Skill *What pupils will be able to do***
	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skill	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills

	KS3 Module 16: *(Year 9 Module 4 of 6 – start date W.C. 28.3.22)*	KS3 Module 17: *(Year 9 Module 5 of 6 – start date W.C. 25.4.22)*	KS3 Module 18: *(Year 9 Module 6 of 6 – start date W.C. 6.6.22)*
	Knowledge *What pupils will know*	**Knowledge *What pupils will know***	**Knowledge *What pupils will know***
	Ratio and Proportion • Scale drawings • Ratio notation • Equivalent ratios and fractions • Direct and inverse proportion • Real life graphs Geometry and Measure • Pythagoras' theorem • Trigonometry in right angled triangles (SOHCAHTOA) • Units of measure • Area, perimeter and volume, including compound shapes (including complex e.g. L shapes) • Problems involving area, perimeter and volume (including money problems)	Algebra • Understand equivalence • Order of operations • Simplify and manipulate algebraic expressions Number • Place value • Rounding and estimation • Equivalence and ordering of fractions, decimals and percentages • Four operations (FDP) • Four operations (BIDMAS) Probability • Exhaustive probabilities • Single event probability • Diagrams to calculate probabilities • And /Or Rule	Data • Compare data sets • Averages Geometry and Measure • Single and combined transformations • Translation using 2D vectors • Use column representation of vectors • Similar Shapes (lengths, area and volume)) • Ruler and Compass constructions
	Skill *What pupils will be able to do*	**Skill *What pupils will be able to do***	**Skill *What pupils will be able to do***
	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions Display fluency • Reason mathematically including written communication skills

Key Stage 3 Learning Sequences

Year 7 Learning Sequence (Programme of Study)

Year 7: Module 1 Algebraic Thinking Sep 22 Trust PILOT	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Unit 1: Sequences • How to define linear, oscillating, pictorial and geometric sequences • Understand constant difference • **Understand second difference** **Unit 2: Understand and use algebraic notation** • Understand input and outputs of function machines • Understand inverse operations • Understand algebraic notation • Understand substitution **Unit 3: Equality and Equivalence** • Understand the terms equality, equation, equals and how these are connected • Understand how term, coefficient and expression are linked	**Unit 1: Sequences** • Describe changes from one term to the next for pictorial, linear, oscillating and geometric sequences. • Predict the next term of the above sequences • Create diagrams to illustrate sequences • Categorise linear and non-linear sequences • Work out the next term a sequence of numbers **Unit 2: Understand and use algebraic notation** • Apply four operations to a function machine • Apply an inverse operation • Use algebraic notation • Use a calculator for basic arithmetic • Substitute numbers for letters • Plot the graphs of basic linear and non-linear functions **Unit 3: Equality and Equivalence** • Solve one-step equations • Solv • Identify like and unlike terms • Collect like terms and simplify expressions	**Unit 1: Sequences** Arithmetic, ascending, axes, constant difference, descending, difference, Fibonacci, geometric, graph, linear, non-linear, rule, second difference, sequence, table, term, position, term-to-term **Unit 2: Understand and use algebraic notation** Axes, axis, bracket, coefficient, commutative, constant, curve, equation, estimate, evaluate, expression, function, graph, input, inverse, linear, non-linear, operation, order, output, position to term, rule, scale, sequence, square, substitute, variable • $\boldsymbol{ab}$ in place of $\boldsymbol{a} \times \boldsymbol{b}$ • $\boldsymbol{3y}$ in place of $\boldsymbol{y} + \boldsymbol{y} + \boldsymbol{y}$ and $\boldsymbol{3} \times \boldsymbol{y}$ • $\boldsymbol{a^2}$ in place of $\boldsymbol{a} \times \boldsymbol{a}$ • $\frac{\boldsymbol{a}}{\boldsymbol{b}}$ in place of $\boldsymbol{a} \div \boldsymbol{b}$ **Unit 3: Equality and Equivalence** bar model, coefficient, collect, equality, equals, equation, equivalent, expression, fact family, index, inverse, is equal to, like,
National Curriculum			

Unit 1: Sequences
• move freely between different numerical, algebraic, graphical and diagrammatic representations
• make and test conjectures about patterns and relationships
• use a calculator and other technologies to calculate results accurately and then interpret them appropriately
• generate terms of a sequence from a term-to-term rule
• recognise arithmetic sequences
• recognise geometric sequences and appreciate other sequences that arise
 	
Unit 2: Understand and use algebraic notation
• move freely between different numerical, algebraic, graphical and diagrammatic representations
• use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
• recognise and use relationships between operations including inverse operations
• model situations or procedures by translating them into algebraic expressions
• substitute values in expressions, rearrange and simplify expressions
• use and interpret algebraic notation, including:
  ○ $\boldsymbol{ab}$ in place of $\boldsymbol{a} \times \boldsymbol{b}$
  ○ $\boldsymbol{3y}$ in place of $\boldsymbol{y} + \boldsymbol{y} + \boldsymbol{y}$ and $\boldsymbol{3} \times \boldsymbol{y}$
  ○ $\boldsymbol{a^2}$ in place of $\boldsymbol{a} \times \boldsymbol{a}$
  ○ $\frac{\boldsymbol{a}}{\boldsymbol{b}}$ in place of $\boldsymbol{a} \div \boldsymbol{b}$
• generate terms of a sequence from a term-to-term rule
• produce graphs of linear functions of one variable
 	
Unit 3: Equality and Equivalence
• use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
• simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms
• use approximation through rounding to estimate answers
• use algebraic methods to solve linear equations in one variable
	simplify, solution, solve, term, unknown, unlike

Builds on (pre-requisite knowledge)	Links to future learning
• Sequence events in chronological order using language, e.g. before, after, today, yesterday etc. • Recognise odd and even numbers • Generate and describe linear number sequences • Describe positions in all four quadrants of a coordinate grid	Within KS3: • Generate sequences given a rule in words • Generate sequences given algebraic rules • Find the nth term of a linear sequence • Test conjectures about sequences

• Recognise and use multiples of number • Number bonds • Recognise and use square and cube numbers • Solve one-step problems e.g. 7 = ☐ – 4 • Use negative numbers in context • Calculate intervals across zero • Round any whole number to a required degree of accuracy.	• Fibonacci type sequences • Substitution with directed number • Simple algebraic fractions • Indices and powers • Collecting like terms with directed number • Working with algebraic brackets • Identifying and using formulae, expressions, identities and equations • Rearranging equations/formulae • Testing algebraic conjectures Within KS4: • Find the nth term of a quadratic sequence • Sequences with surds • Powers and roots • Functions • Composite and inverse functions • Factorise quadratics • Algebraic proof

Year 7 Learning Sequence (Programme of Study)

	Component title	Lesson no.	Phase objectives	Launch	Revisit	Assessment Marking	Any other subject specific drivers
Year 7: Module 1 Algebraic Thinking	**How do we use sequences to represent patterns?** Suggested length of time: 6 to 10 lessons	**1**	To describe and continue a sequence given diagrammatically	Sequences as pictures	Number bonds	Formative in class Address misconceptions	Access to manipulatives to support where necessary
		2a	Consolidation on KS2 plotting coordinates	This is not necessary for all classes, only those who may struggle plotting coordinates.			
		2	To predict and check the next term/s of a sequence Represent sequences in tabular and graphical forms		2D shape names	Formative in class Address misconceptions	Focus is not on plotting graphs
		3	To recognise the difference between linear and non-linear sequences To continue numerical linear sequences	Sequences in tables Sequences in graphs	Coordinates	Formative in class Address misconceptions	
		4	To continue numerical non-linear sequences	Linear and geometric sequences		Formative in class Address misconceptions	
		5	To explain the term-to term rule of numerical sequences in words			Formative in class Address misconceptions	Discourage use of “it doubles” or “you times it by three”. Insist on full sentences.
		6	**To find missing numbers within sequences (not essential for non-advanced learners)**	Higher topic: not necessary for all classes, class teachers to decide on individual classes/pupils suitability for this.			

	How do we understand and use algebraic notation? Suggested length of time: 7 to 11 lessons	**7**	To calculate the outputs and inputs of function machines	Inverse	Number machines	Formative in class Address misconceptions	
		8	Generalise a number using algebra	Bar modelling		Formative in class Address misconceptions	
		9	Apply algebra to function machines		Function machines	Formative in class Address misconceptions	
		10	Find functions from expressions		Function machines	Formative in class Address misconceptions	
		11	Substitute into expressions	Bar modelling		Formative in class Address misconceptions	
		12	Generate sequences	Continuing a sequence	Substitution	Formative in class Address misconceptions	
		13	Represent functions graphically	Substitution	Plotting coordinates	Formative in class Address misconceptions	
	How does equality apply to maths? Suggested length of time: 6 to 10 lessons	**14**	Understand the meaning of equality	Equality		Formative in class Address misconceptions	
		15	Understand and use fact families, numerically and algebraically			Formative in class Address misconceptions	
		16	Solve one-step linear equations involving addition and subtraction	Inverse operations		Formative in class Address misconceptions	Only use inverse operations to solve

		17	Solve one-step linear equations involving multiplication and division			Formative in class Address misconceptions	Only use inverse operations to solve
		18	Understand the meaning of like and unlike terms	Like terms		Formative in class Address misconceptions	
		19	Understand the meaning of equivalence	Equivalence		Formative in class Address misconceptions	
		20	Collect like terms			Formative in class Address misconceptions	Use ≡ to show equivalence
		21					
		22					
		23					
		24					
		25					
		26					

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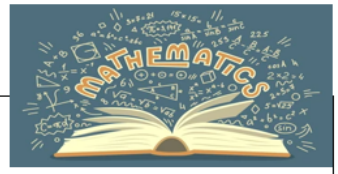
LDA Mathematics
Curriculum Passport Year7
Module 1 Algebraic Thinking

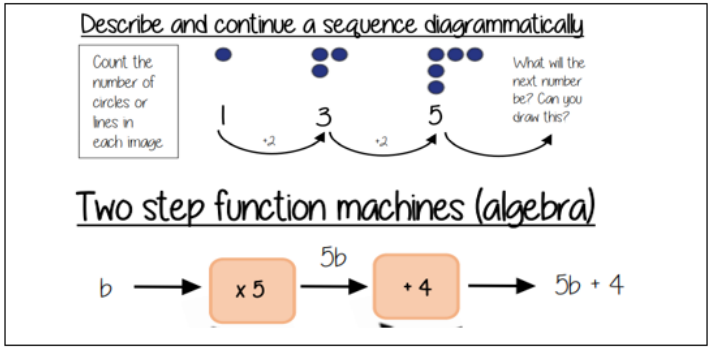


Powerful Vocabulary

- Sequence
- Linear
- Term
- Function
- Input Output
- Operation
- Substitute
- Expression
- Equals
- Solve

MathsWatch Clips

A4, A6, A10, A11, 137



Links To Other Subjects

Science, Business, Food and Nutrition

Probing Questions?

- I have a number sequence in my head. How many questions would you need to ask me to be sure you know my number sequence? What are the questions?
- How do you go about linking a formula that has been expressed in words to a formula that has been expressed algebraically?

Foundation	Developing	Secure	Advanced
• I can find the output for a single function machine when I know the input value. • I can find the output for a double function machine when I know the input value. • I can write down a sequence, given the first term and a term-to-term rule • I can substitute numbers into algebraic expressions, such as 2n + 3. • I can simplify algebraic expressions such as 2a + 5a.	• I can find the output for a single and double function machine when I know the input value. • I can write down a sequence, given the first term and a term-to-term rule. • I can give the term-to-term rule for a sequence. • I can substitute numbers into algebraic expressions, such as 2n + 3. • I can simplify algebraic expressions such as 2a + 5a.	• I can work out the output values for a function machine when I know the input values. • I can work out the term-to-term rule for a sequence. • I can work out any term in a sequence, given the first term and the term-to-term rule. • I can recognise and work out the sequence of triangular numbers. • I can substitute numbers into algebraic expressions, such as 2n + 3. • I can simplify algebraic expressions such as 2a + 5b + 5a + 7b by collecting like terms.	• I can work out any term in a sequence, given the first term and the term-to-term rule. • I can investigate the patterns and connections within the square and triangular numbers. • I can recognise and work out the numbers in the Fibonacci sequence and in Pascal's triangle. • I can find equivalent algebraic expressions, such as 3x+2x and 7x−2x. • I can simplify algebraic expressions, such as 2a+5b+5a+7b, by collecting like terms. • I can represent functions graphically. • I can form and solve linear equations

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 2/6 w.c. 31st October 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Number • Directed Number • Four operations (including BIDMAS) • Powers and Roots • Place value • Units of measure • Rounding and estimation • Four operations (Decimals) Geometry and Measure • Area, perimeter, including compound shapes	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• Integer • Decimal • Fraction • Percentage • Multiplication, times by, lots of • Division, out of , goes into • Addition, and, total • Subtraction, take away, minus • Column method • Grid method • Bus stop method • Powers/ Index/Indices • BIDMAS • Rounding • Estimation • Approximately • Significant Figure • Area • Perimeter • Formula • Compound Shapes • Calculate, evaluate, work out • Metric units: km, m, cm, mm

National Curriculum

- Use their knowledge of the order of operations to carry out calculations involving the four operations.
- Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- Recognise and use relationships between operations including inverse operations.
- Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
- Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots.
- Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations.
- Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- Understand and use place value for decimals, measures and integers of any size.
- Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes.
- Recognise that shapes with the same areas can have different perimeters and vice versa.
- Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	• Looking at architecture and engineering of buildings and bridges	Webinars - Student - Unifrog	Metric units, area and perimeter.	https://theday.co.uk/logged-out/

Year 7 Learning Sequence (Scheme of Work)

	Key Knowledge *What will pupils know?*	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 7: Module 2/6 w.c. 30th October 2022		1	• To learn and understand some routines that can be used when calculating mentally		**Maths in real life**: Performing quick mental calculations is essential in a game such as darts, where players need to work out the target numbers, they must score to finish the game. They have to think about the possible number combinations of scores from three darts.	Times Tables up to 12 x12 Place value	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To choose a written method for multiplying two numbers together accurately. (Include algebraic rules- Commutative rule of multiplication)				Formative in class Address misconceptions Oracy skills- think pair share
		3	• To use written methods to carry our divisions accurately				Formative in class Address misconceptions Oracy skills- think pair share
		4	• To use the conventions of BIDMAS to carry out calculations				
		5	• To use the conventions of BIDMAS to carry out calculations				
		6	• To use some of the important keys when working on a calculator				
		7	**RMP/Application: Bridge the gap**			Phases 1-6	Formative in class Visualiser comparison Live marking

		8	• To understand and use powers and roots		**Maths in real life**: Powers are used by scientists such as astronomers, who are dealing with massive spaces, or cell biologists, who are dealing with tiny ones. They use numbers in Standard Form, which are numbers expressed as products of powers of ten.	Times tables up to 12x12	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		9	• To write algebraic expressions involving powers				
		10	• To write a number as a power of another number			Division Prime Factors Place value	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		11	• To multiply and divide by 100 and 1000				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		12	• To mentally multiply and divide by a power of ten				
		13	• To convert between common metric units				
		14	• To understand and work with both positive and negative powers of ten				
		15	• **RMP/Application: Bridge the gap**			Phase 8-14	Targeted learning based on trends
		16	• To use measurements in calculations		**Maths in real life**: The term 'ball park' figure for an estimate originates with US newspapers reporting on attendances at baseball games. They tend to round numbers to the nearest thousand to give an	Metric units of measures. Time tables up to 12x12	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		17	• To use approximation to estimate answers and check calculations				
		18	• To round numbers to the nearest whole number 10, 100 or 1000				
		19	• To round decimal numbers to a given accuracy.			Rounding rules to the nearest 10, 100	Formative in class Address misconceptions Use of visualiser Oracy skills- think pair share

			• round a calculation at the end of a problem, to give what is considered to be a sensible answer.		approximate value that is close enough to give a good idea of the number of people in the 'ball park'.		
		20	**RMP/Application: Bridge the gap**			Phase 16-19	Targeted learning based on trends
		21	• To order decimal numbers according to size		**Maths in real life**: Fractional numbers can be written in two ways: as fractions, or with a decimal point. Decimals are often more convenient to use and calculate with, but some simple fractions yield recurring or complex decimals.	Number line	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		22	• To add and subtract decimal numbers			4 operations	
		23	• To be able to multiply and divide decimal numbers by any whole number			Place value	
		24	• To multiply and divide decimal numbers by decimal numbers.			Multiplying by powers of 10	Formative in class Address misconceptions Use of visualiser Oracy skills- think pair share
		25	• To make links between fractions, decimals and percentages				
		26	• To solve problems involving decimals				
		27	• **RMP/Application: Bridge the gap**			Phase 21-26	Targeted learning based on trends

		28	• To work out the area of a shape by counting squares.		**Maths in real life**: The Pentagon is the headquarters of the USA Defense Department, and is one of the biggest offices in the world. The five-sided building has a perimeter of about 1.4 kilometres, and its buildings cover an area of 600 000 m^2.	Difference between area and perimeter. Mental calculations BIDMAS Square numbers Square roots	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share Use of visualiser
		29	• To use a simple formula to calculate the area and perimeter of a rectangle, parallelograms, triangles and trapeziums.				
		30	• To work out the perimeter and area of compound shapes				
		31	**RMP/Application: Bridge the gap**			Phase 28-30	Targeted learning based on trends
		32	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Maths Comprehension
		33	**Revision session**				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		34	**Revision session**				
		35	**APPLICATION** – Assessment.				**Assessed piece** Deep mark
		36	**ASSESSMENT RMP**				Address misconceptions Live Marking

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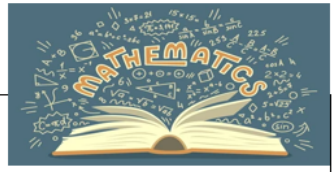
LDA Mathematics

Curriculum Passport Year 7
Module 2 Number and Shape



Powerful Vocabulary

- Integer
- Decimal point
- Decimal place
- Round
- Power
- Estimation
- BIDMAS
- Operations
- Formula
- Compound

Knowledge Recall

B	Brackets
I	Indices
D	Division
M	Multiplication
A	Addition
S	Subtraction

$2^1 = 2 = 2$
$2^2 = 2 \times 2 = 4$
$2^3 = 2 \times 2 \times 2 = 8$

Area

Parallelogram/Rectangle
$A = b \times h$

Triangle
$A = \frac{b \times h}{2}$

Trapezium
$A = \frac{1}{2}(a + b) \times h$

Probing Questions?

- Show me a length that rounds 5.6 m to one decimal place. Are there other lengths?
- Is the following statement always, sometimes or never true? If a rectangle has a larger perimeter than another rectangle, it will also have a larger area.

MathsWatch Clips

N1, N2, N13, N14, N15, N20, N25, N27, N28, N29, G8, G9

Links To Other Subjects

Science, Design and Food Technology and Geography

Foundation	Developing	Secure	Advanced
• I can order decimals by size. • I can add and subtract decimal numbers. • I can use BIDMAS with simple calculations. • I can multiply and divide decimal numbers by 10 and 100. • I can find the perimeter of a shape. • I can find the area of a rectangle.	• I can order decimals by size. • I can add and subtract decimal numbers. • I can use BIDMAS. • I can multiply and divide decimal numbers by 10, 100 and 1000. • I can multiply and divide decimals by any whole number. • I can find the perimeter of a shape. • I can calculate the area of triangle.	• I can use the four operations with decimals. • I can use and understand BIDMAS. • I can calculate using different powers. • I can round using significant figures. • I can use estimation. • I can find the area of a 2D shape. • I can find the perimeter of compound shapes. • I can find the area of compound shapes.	• I can use the four operations with decimals. • I can estimate answers and check if an answer is about right to one decimal place. • I can multiply and divide a decimal by a decimal. • I can work out the area and perimeter of a compound shape. • I can work out the area of a triangle, of a parallelogram and of a trapezium by using the appropriate formula.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 3/6 Statistics and Number	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Collecting data • Averages • Charts, tables and diagrams Number • Factors, Multiples, Primes • Equivalence and ordering of fractions, decimals and percentages • Four operations (Fractions) • Percentages • Percentage problems	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• *Average* • *Median* • *Outlier* • *Data* • *Mode* • *Range* • *Frequency* • *Modal* • *Sample* • *Grouped frequency* • *Decimal* • *Fraction* • *Percentage* • *Quantity* • *Proportion* • *Ratio* • *Deposit*

National Curriculum

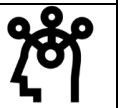
- Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation properties.
- Work interchangeably with terminating decimals and their corresponding fractions.
- Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%.
- Interpret fractions and percentages as operators.
- Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	Financial Banking workshops		Knowledge of times tables 12 x 12, factors and multiples, percentages and decimals	https://theday.co.uk/logged-out/

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 3/6 Statistics and Number w.c. 5th January 2022	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
	Statistics; Which is the best average to use?	1	• To understand the meaning of mode, median and range.		In the UK a census is carried out every 10 years. This records statistical data about everyone living in the country that can be analysed and interpreted by governments to make decisions.	Four operations	Formative in class Address misconceptions
		2	• To understand and calculate the mean average of data			Mode and Median	Formative in class Address misconceptions
		3	• To read data from tables and charts				Formative in class Address misconceptions
		4	• To create and use a tally chart				Formative in class Visualiser comparison
		5	**RMP/Application: Bridge the gap**			Phases objectives 1-4	Targeted learning based on trends
		6 7	• To be able to read and interpret different statistical diagrams				Formative in class Address misconceptions
		8	• To understand how to use (and collect) data				Formative in class Address misconceptions
		9 10	• To understand and use grouped frequency.			Mean Median Mode	Formative in class Address misconceptions
		11	• To gain a greater understanding of data collection				Formative in class Visualiser comparison
		12	• To decide which is the best average to use to represent a data set				
		13	**RMP/Application: Bridge the gap**			Phases objectives 6 - 12	Targeted learning based on trends
		14	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)			TBC	Focus TBC

	Number; How do fractions, decimals and percentages relate?	**15**	• To identify primes, factors and multiples		Percentages allow quick comparison of value when prices are reduced in a sale. They can also be used to compare financial data such as the interest on bank savings accounts. Students are introduced to ancient Egyptian unitary fractions, which will be used later in the chapter. In this system, all fractions had 1 as a numerator and larger fractions were created by adding together unitary fractions, egg ½ + ¼ = ¾ The decimal number system is based on 10, and the numbers we use derive from the		
		16	• To identify the lowest common multiple (LCM) of two numbers • To identify the highest common factor (HCF) of two numbers			Factors and multiples	Formative in class Address misconceptions
		17	• To recognise different types of fractions, terminating decimals and recurring decimals.			Fractions	Formative in class Visualiser comparison
		18	• To convert fractions to decimals			Decimals	Formative in class Address misconceptions
		19	• To convert terminating decimals to fractions				
		20	**RMP/Application: Bridge the gap**			Phases objectives 15-19	Targeted learning based on trends
		21	• To understand what a percentage is				Formative in class Visualiser comparison
		22	• To understand the equivalence between some simple fractions and percentages			FDP	
		23	• To find a fraction of a quantity				Formative in class Address misconceptions
		24	• To find a percentage of a quantity				Formative in class Address misconceptions
		25	• To write a percentage as a decimal				
		26	**RMP/Application: Bridge the gap**			Phases objectives 21-25	Targeted learning based on trends
		27	• To use a calculator to find a percentage of a quantity				

		28	• To work out the result of a simple percentage change		Hindu-Arabic number system. Often we refer to decimals when we mean decimal fractions: tenths (0.1), hundredths (0.01), thousands (0.001), etc.		Formative in class Visualiser comparison
		29	• To calculate the original value, given the result of a percentage increase or decrease.				Formative in class Address misconceptions
		30	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)			TBC	Focus TBC
		31	**APPLICATION** – Teacher assessment based on the content taught to date.				**Assessed piece** Deep mark

The Dean Trust
Lord Derby Academy

LDA Mathematics
Curriculum Passport Year 7
Module 3 Statistics and Number

Powerful Vocabulary

- Average
- Median
- Mode
- Mean
- Range
- Factor
- Frequency
- Grouped frequency
- Equivalent
- Denominator
- Numerator
- Multiple

Knowledge Recall

Memory

Mean: Sum Total ÷ Total Frequency
Median: Number in the middle (in order)
Mode: Most common (highest frequency)
Range: Biggest – Smallest

50% - divide by 2.
25% - half 50%.
10% - divide by 10.
1% - divide by 100.
5% - half 10%.

Probing Questions?

- Can you give one example using discrete data, and one using continuous data?
- Two sets of data both have the same range but different median. Explain how these two distributions may differ.

MathsWatch Clips

15, S6, 62, S4, 63, S8, 129.

N23b,N34, N23c, N36, N35, N41.

Links To Other Subjects

Geography, History, Science, P.E, Design and Technology, Art, Food and Nutrition

Foundation	Developing	Secure	Advanced
• I can find the median, mode and range for a set of data. • I can use a data collection form to collect data and group data. • I can find simple equivalent fractions. • I can write fractions in their simplest form. • I can write a percentage as a decimal.	• I can find the median, mode and range for a set of data. • I can use a data collection form to collect data and compare two simple distributions. • I can group data, where appropriate, into equal class intervals. • I can find simple equivalent fractions. • I can write fractions in their simplest form. • I can increase, or decrease a quantity by a percentage by adding or subtracting from the original value.	• I can find the median, mode and range for a set of data. • I can use a data collection form to collect data and compare two simple distributions. • I can group data, where appropriate, into equal class intervals. • I can find equivalent fractions, and compare fractions with different denominators. • I can work out the result of a percentage change • I can work out a fraction or a percentage of a quantity.	• I know the difference between discrete and continuous data. • I can understand and draw a scatter graph. • I can draw a scatter graph from given data and describe any correlation shown in a scatter graph. • I can calculate the original value, given the result of a percentage increase or decrease.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 4/6 Solving Equations & Sequences	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Solving Equations • Form/solve expressions and equations Sequences • Generate terms of a sequence and understand when a term is, or is not, part of a sequence • Angle facts	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• *Algebra* • *Unknown number* • *Equation* • *Solve* • *Inverse* • *Operation* • *Variable* • *Linear* • *Term* • *Coefficient* • *Sequence* • *Geometric sequence* • *Term to term rule* • *Linear sequence* • *First term* • Acute angle • Obtuse angle • Right angle • Vertically opposite • Angles at a point • Isosceles Triangle • Perpendicular • Vertex • Rhombus • Kite

National Curriculum

- Substitute values in expressions, rearrange and simplify expressions, and solve equations
- Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)
- Generate terms of a sequence from either a term-to-term or a position-to-term rule
- Recognise arithmetic sequences and find the nth term
- Recognise geometric sequences and appreciate other sequences that arise
- Draw and measure line segments and angles in geometric figures
- Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids
- Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	Financial Banking workshops	Careers display board Links to Real Life	Express missing number problems algebraically. Generate and describe linear number sequences. Order and arrange combinations of mathematical objects in patterns and sequences	https://theday.co.uk/logged-out/

			Identify acute and obtuse angles and compare Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees (o) Identify: angles at a point and one whole turn (total 360o), angles at a point on a straight line and half a turn (total 180o) Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 4/6 Solving Equations and Sequences W.C. 28th February 2022	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
	Solving Equations; Why does the inverse operation always work when solving equations?	**1**	• To find missing numbers in simple calculations		**Maths in real life**: Modern algebra started with the work of the Arabic mathematician Al-Khwarizmi (750–850 AD). He called his method *al-jabr*, which is Arabic for 'restoration' or 'completion'. From *al-jabr* we get the English word 'algebra'.	Number bonds to 10, 100 Times tables up to 12x12	Formative in class Address misconceptions
		2	• To understand what an equation is				Formative in class Address misconceptions
		3	• To solve equations involving one operation				Formative in class Address misconceptions
		4	• To solve equations involving two operations				Formative in class Visualiser comparison
		5	**RMP/Application: Bridge the gap**			Phase 1-4	Targeted learning based on trends
		6	• To use algebra to set up and solve equations			"I think of a number" style questions	Formative in class Address misconceptions
		7					
		8	**Flexi lesson –** Some classes will look at solving more multi step problems.				Formative in class Address misconceptions

	Sequences; How do you know if a sequence is linear?	**9**	• To use function machines to generate inputs and outputs		**Maths in real life**: Coded sequences form the basis of secure communication, from the Enigma machine in WW2, to encryption in modern-day financial websites.	Inverse operations Looking for patterns	Formative in class Address misconceptions
		10	• To recognise, describe and write down sequences that are based on a simple rule				Formative in class Visualiser comparison
		11					
		12	• To find missing terms in a sequence				Oracy skills- think pair share
		13	**RMP/Application: Bridge the gap**			Phases 9-12	Targeted learning based on trends
		14	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)			Literacy- Maths text Comprehension	Focus TBC
		15	• To introduce the sequence of square numbers			For any linear sequence: Recognise it Describe a rule Find the nth term Find missing terms	
		16	• To introduce the sequence of triangular numbers				Formative in class Address misconceptions
		17	• To know and understand square and triangular number sequences				Formative in class Visualiser comparison
		18	**RMP/Application: Bridge the gap**			Phases 14-17	Targeted learning based on trends
		19	**Flexi lesson –** Some classes will look at finding the nth term			TBC	Formative in class Address misconceptions
		20	• To use a compass to give directions		**Maths in real life**: Fibre optics, used for ultrafast telephone and broadband	Know acute, obtuse, reflex , right angles, full turns, half terns,	
		21	• To know the different types of angles • To use a protractor to measure an angle				Formative in class Visualiser comparison

	Angle Facts; **Does the size of the shape affect the angle?**	**22**	• To use a protractor to draw an angle		communications, rely on the critical angle to ensure light is constantly reflected back from the sides as it passes down the glass optical fibre.	angles on a straight line. Being able to use a ruler and count cm and mm.	Formative in class Address misconceptions
		23	• To calculate angles at a point • To calculate angles on a straight line				Formative in class Address misconceptions
		24	• To know that the sum of the angles in a triangle is 180°				
		25	• To know that the sum of the angles in a quadrilateral is 360°				Formative in class Visualiser comparison
		27	**RMP/Application: Bridge the gap**			Phases 20-25	Targeted learning based on trends
		29	**APPLICATION** – Teacher assessment based on the content taught to date.			**End of Term Assessment**	**Assessed piece** Deep mark

THE DEAN TRUST
Lord Derby Academy

LDA Mathematics
Curriculum Passport Year 7
Module 4 Equations, Sequences and Angles

Powerful Vocabulary

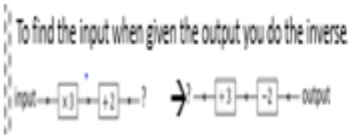
- Equation
- Solve
- Inverse
- Vertically opposite
- Angles at a point
- Operation
- Variable
- Linear
- Term
- Sequence

Knowledge Recall

To solve an equation do the **inverse.**

$$2x + 3 = 13$$
$$-3 \quad -3$$
$$2x = 10$$
$$\div 2 \quad \div 2$$
$$x = 5$$

To find the input when given the output you do the inverse



Angles around a point sum to 360°
Angles at a point on a straight line sum to 180°
Angles in a triangle sum to 180°
Angles in a quadrilateral sum to 360°

Probing Questions?

- How do you go about constructing equations from information given in a problem?
- How do you check whether the equation works?
- Can you use that the sum of the angles on a straight line is 180°, to explain why angles at a point are 360°?

MathsWatch Clips

A10, A12, A17, A11, G10, G13, G14, G16, G17

Links To Other Subjects

Science, Physics, Design and technology, Art, Geography, PE

Foundation	Developing	Secure	Advanced
• I can write down a sequence, given the first term and a term-to-term rule. • I can state the names for different types of angles. • I can use that angles on a straight line add up to 180°. • I can solve simple problems about triangles and quadrilaterals.	• I can solve simple equations that involve one operation. • I can write down a sequence, given the first term and a term-to-term rule and the term-to-term rule for a sequence. • I can use that angles at a point add up to 360°. • I can describe the properties of simple 2D shapes.	• I can set up and solve an equation for a simple real-life problem. • I can work out any term in a sequence, given the first term and the term-to-term rule. • I can recognise and work out the sequence of triangular numbers. • I can recognise parallel, intersecting and perpendicular lines.	• I can solve equations that involve two or more operations. • I can work out any term in a sequence, given the first term and the term-to-term rule and find the nth term. • I can recognise and work out the numbers in the Fibonacci sequence and in Pascal's triangle. • I can calculate angles in parallel lines, angles at a point, angles on a straight line, vertically opposite angles and angles in a triangle.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 5/6 Ratio Proportion and Volume	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Ratio • Scale drawings • Ratio notation • Equivalent ratios and fractions Proportion • Direct and inverse proportion • 3D Shapes and Volume	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Net 3D/2D shapes Elevation Isometric grid Plan Estimate Scale Drawing Ratio Quantity Scale factor Cancel Simplest form Common unit Direct proportion Unitary method

National Curriculum

- Pupils calculate the area from scale drawings using given measurements.
- Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems.
- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.
- Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.
- Solve problems involving similar shapes where the scale factor is known or can be found.
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples recognise and show, using diagrams, equivalent fractions with small denominators.
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- Recognise when it is possible to use formulae for area and volume of shapes.
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	Financial Banking workshops	Careers display board Links to Real Life	KS2 National Curriculum	https://theday.co.uk/logged-out/

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 5/6 Ratio Proportion and Volume W.C. 25th April 2022	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
	Ratio and proportion? Why do we use scale factor in ration and proportion?	**1**	• To read and draw scale drawings		**Maths in real life**: Scale diagrams can be used to represent large distances, such as on maps and satellite navigation systems, and to represent a 3D shape using plans and elevations.	Be able to measure and draw lines. Know that 100 cm = 1 m and 1000 m = 1 km. Multiplying and dividing by powers of 10. Nets for cubes and cuboids Know the names of 3D shapes and 2D shapes.	Formative in class Address misconceptions
		2	• To use a scale drawing to make estimates				Formative in class Address misconceptions
		3	• Read from and draw on isometric grids				Formative in class Address misconceptions
		4	• Interpret diagrams to draw plans and elevations.				Formative in class Visualiser comparison Oracy skills- think pair share
		5					
		6	**RMP/Application: Bridge the gap**			Phase 1-5	Formative in class Address misconceptions
		7	• To introduce ratio notation • To use ratios to compare quantities		**Maths in real life**: Ratios are used when mixing ingredients.	Know how to simplify fractions.	Formative in class Address misconceptions Oracy skills- think pair share

	What's the difference between ratio and proportion?	8	• To write a ratio as simply as possible		Hairdressers use it to get the right colour. Bakers use it to bake tasty cakes. Builders use it to make strong concrete.	Know how to find a fraction of a quantity. Know how to multiply and divide, with and without a calculator.	Formative in class Address misconceptions Oracy skills- think pair share
		9	• To divide amounts into given ratios				Formative in class Address misconceptions
		10	• To use ratios to find missing quantities				Formative in class Address misconceptions
		11	• To use ratios to find missing quantities				Formative in class Visualiser comparison Oracy skills- think pair share
		12	• To understand the connection between ratios and fraction				
		13	• **Flexi lesson –** Some classes will look at solving more multi step problems.				Oracy skills- think pair share
		14	**RMP/Application: Bridge the gap**			Phases 7-13	Targeted learning based on trends
		15	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Focus TBC
		16	• To recognise and solve problems that involve direct proportion		**Maths in real life**: There are many real life examples of direct proportion (as plants get older they get taller; as a car goes faster, the journey time decreases) and	Multiply and divide without using a calculator	Formative in class Address misconceptions
		17					
		18	• To solve problems in which two variables have an inversely proportional relationship				Formative in class Visualiser comparison Oracy skills- think pair share
		19					Formative in class Address misconceptions Oracy skills- think pair share
		20	• Recognising direct or inverse proportion				

		21			inverse proportion (as more songs are downloaded, there is less money left on a gift voucher).		
		22	**RMP/Application: Bridge the gap**			Phases 16-21	Targeted learning based on trends
	What's the difference between volume and surface area?	**23**	• To work out the volume of a cube or cuboid counting cubes		**Maths in real life**: Being able to calculate surface area and volume for 3D shapes allows you to solve design problems, such as the amount of material needed to create a football of specified diameter.	How to work out the perimeters and areas of squares and rectangles How to work out the volumes of cubes and cuboids.	Formative in class Address misconceptions
		24	• To work out the capacity of a cube or cuboid using a simple formula				Formative in class Address misconceptions Oracy skills- think pair share
		25	• To work out the capacity of a cube or cuboid with missing information				Formative in class Address misconceptions Oracy skills- think pair share
		26	• To calculate the surface area cube and a cuboid				Formative in class Visualiser comparison
		27					
		28	**APPLICATION** – Teacher assessment based on the content taught to date.			**End of Term Assessment**	**Assessed piece** Deep mark

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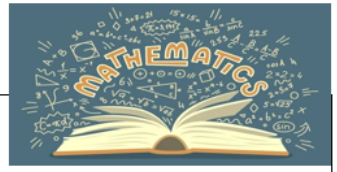
LDA Mathematics
Curriculum Passport Year 7
Module 5 Ratio and Proportion



Powerful Vocabulary

- Divide
- Quantity
- Unitary
- Ratio
- Proportion
- Compare
- Volume
- Surface Area
- Prism
- Cross Section

MathsWatch Clips

R1, R5, G21, N7a, G25, 112, 119

Knowledge Recall

Share £25 in the ratio 3: 2

£5	£5	£5	= £15
£5	£5		= £10

Volume of a Prism

$V = area\ of\ the\ cross\text{-}section \times depth$

Surface Area of a Prism

$A = sum\ of\ the\ area\ of\ each\ face$

Links To Other Subjects

Science, Geography, Design and Technology

Probing Questions?

- When you are given a ratio, how do you know if it is in its simplest form?
- How would you convert metres squared to centimetres squared?

Foundation	Developing	Secure	Advanced
• I can use ratio notation. • I can use ratios to compare quantities. • I can write a fraction if I am given a ratio. • I can work out the surface areas of cubes and cuboids. • I can work out the volumes of cubes and cuboids.	• I can write a ratio as simply as possible. • I can share a quantity in a given ratio. • I can work out the capacities of cubes and cuboids, measured in litres. • I can work out the volume of a triangular prism.	• I can compare quantities using ratios. • I can use ratios to find totals or missing quantities. • I can convert the metric units for area, volume and capacity. • I can calculate the volume of a prism. • I can calculate the surface area of a prism.	• I can compare quantities, using ratios either in the form A:B or in the form x:1. • I can calculate the volume of a cylinder. • I can calculate the total surface area of a cylinder. • I can calculate the volume of complex composite 3D shapes.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 7 Learning Sequence (Scheme of Work)

Year 7: Module 6/6 Co-ordinates and Probability	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Algebra • Coordinates in all four quadrants • Draw a linear graph Probability • Exhaustive probabilities • Single event probability • Diagrams to calculate probabilities • And/Or Rule • Single and combined transformations	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	*Axes* *Coordinate* *Origin* *Quadrant* *X-axis* *X-coordinate* *Y-axis* *Y-coordinate* *Graph* *Relationship* *Straight-line graph* *Equally likely* *Event* *Outcome* *Probability* *Probability fraction* *Probability scale* *Random* *Trial* *Exhaustive* *Mutually exclusive* *Experimental data* *Experimental probability* *Relative frequency* *Theoretical probability*

National Curriculum

- Describe positions on the full coordinate grid (all four quadrants)
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes
- Work with coordinates in all four quadrants
- Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale
- Understand that the probabilities of all possible outcomes sum to 1
- Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams
- Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities
- Develop algebraic and graphical fluency, including understanding linear and simple quadratic functions
- Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane
- Reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically
- Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	Financial Banking workshops	Careers display board Links to Real Life	KS2 National Curriculum	https://theday.co.uk/logged-out/

Year 7 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 7: Module 6/6 Co-ordinates and Probability 6 June 2022	How are co-ordinates used to navigate cars?	1	• To understand and use coordinates to locate points		**Maths in real life**: Graphs make it easier to interpret data visually and quickly. An electrocardiogram turns the electrical signals produced by your heart into a graph. Any changes in these signals can be easily monitored and responded to.	Describe positions on the full coordinate grid (all four quadrants) Draw and translate simple shapes on the coordinate plane, and reflect them in the axes	Formative in class Address misconceptions
		2	• To draw a graph for a simple rule				Formative in class Address misconceptions
		3	• To recognise and draw line graphs of fixed values • To draw a graph for a simple relationship				Formative in class Address misconceptions
		4	• To recognise and draw line graphs with fixed values of *x* and *y*				Formative in class Visualiser comparison Oracy skills- think pair share
		5	• To recognise and draw graphs of the form $x + y = a$				
		6	• To learn how graphs can be used to represent real-life situations • To draw and use real-life graphs				
		7	**RMP/Application: Bridge the gap**			Phase 1-6	Formative in class Address misconceptions

	How can your mobile phone predict the weather forecast for the next week?	**8**	• To learn and use words about probability		**Maths in real life**: Real-time probability calculations can be used by scientists to predict the paths of natural disasters and take preventative measures. As Hurricane Sandy approached the east coast of the USA in October 2012, based on the probability of it devastating New York, the mayor ordered the compulsory evacuation of 375 000 people, saving many lives.	The KS2 NC doesn't teach probability. Pupils will need time to understand the probability vocabulary.	Formative in class Address misconceptions Oracy skills- think pair share
		9	• To know and use the 0–1 probability scale				Formative in class Address misconceptions Oracy skills- think pair share
		10	• To work out probabilities based in equally likely outcomes				Formative in class Address misconceptions
		11	• To learn about and understand experimental probability				Formative in class Address misconceptions
		12	• To understand the difference between theoretical and experimental probability				Formative in class Visualiser comparison Oracy skills- think pair share
		13					
		14	• **Flexi lesson –** Some classes will look at solving more multi step problems.		Literacy Lesson- comprehension		Reading together
		15	**RMP/Application: Bridge the gap**			Phases 8-13	Targeted learning based on trends

		16	• To collect data and use it to find probabilities		**Maths in real life**: Probability is used in weather forecasting to combine the chances of different indicators of rain to come up with an overall probability.	The KS2 NC doesn't teach probability.	Formative in class Address misconceptions
		17	• To decide if an event is fair or biased				
		18	• To recognise mutually exclusive events				Formative in class Visualiser comparison Oracy skills- think pair share
		20	• To use a sample space to calculate probabilities				
		21					
		22	**RMP/Application: Bridge the gap**			Phases 16-21	Targeted learning based on trends
		23	• To understand frequency tree diagrams and probability tree diagrams			The KS2 NC doesn't teach probability.	Formative in class Address misconceptions
		24	• To use probability tree diagrams to work out the probabilities involved in combined events P(A or B) = P(A) + P(B)				Formative in class Address misconceptions Oracy skills- think pair share
		25	• Whole year revision and intervention of weak topics. Getting ready for end of year assessments.				Formative in class Address misconceptions Oracy skills- think pair share Visualiser comparison
		26					
		27					
		28					
		29					
		30					
		31					
		32	**APPLICATION** – Teacher assessment based on the content taught to date.			**End of Term Assessment**	**Assessed piece** Deep mark and question level analysis

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 1/6 w.c. 5th September 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Number • KTC4: Directed number • KTC1: Powers, Factors, Multiples, Primes and Roots • KTC10: Indices (index rules) • KTC5: Equivalence and ordering of fractions, decimals and percentages • KTC7: Four operations (F,D,P) • KTC8: Percentages • KTC 36: Percentage problems • KTC6: Four operations (BIDMAS)	• STC1: Use a calculator and ICT • STC2: Apply maths in real life context and solve problems • STC3: Understand Mathematical language • STC4: Identify misconceptions • STC5: Display fluency • STC6: Reason mathematically including written communication skills	• Integer • Power/Index/Indecis • Index notation • Factor • Divisor • Multiple • Highest common Factor • Lowest Common Multiple • Percentage • Percentage increase • Percentage decrease • Reverse percentage • Original amount • Discount • Off • Venn diagrams to work out LCM, HCF • Reciprocal • Ascending • Descending • Equivalent value • Equal

National Curriculum

- Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots
- Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations
- Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- Understand and use place value for decimals, measures and integers of any size
- Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, , ≤, ≥
- Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property
- Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative
- Recognise and use relationships between operations including inverse operations

Enrichment	**Cultural Capital/SMSC**	**Careers**	**Builds on …** *(Pre-requisite knowledge)*	**Reading** *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	• Financial Banking workshops		Basic numeracy skills covered at KS2 and in year 7. Understanding basic place value. Understanding the concept of fractions being part of whole numbers.	https://theday.co.uk/logged-out/

Year 8 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 8: Module 1/6 w.c. 5th September 2022	**Why do we always get square shapes when we arrange a square number of counters?**	**1**	• To carry out additions and subtractions involving negative numbers		**Maths in real life**: Performing quick mental calculations is essential in a game such as darts, where players need to work out the target numbers they must score to finish the game. They have to think about the possible number combinations of scores from three darts.	12x12 Time tables Multiplication and division sign rules Key vocabulary, knowing the difference between factors and multiples.	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To carry out multiplications and divisions involving negative numbers				Formative in class Address misconceptions Oracy skills- think pair share
		3	• To understand and use squares and square roots				Formative in class Address misconceptions Oracy skills- think pair share
		4	• To identify the prime factors of a number				
		5	• To understand and use highest common factors, using Venn Diagrams				
		6	• To understand and use lowest common multiples, using Venn Diagrams				

		7	**RMP/Application: Bridge the gap**			Phases 1-6	Formative in class Visualiser comparison Live marking
	Why do all fractions need to have the same denominator when we compare, order, add or subtract them?	8	• To order fractions with different denominators including mixed numbers.		**Maths in real life**: Fractional numbers can be written in two ways: as fractions, or with a decimal point. Decimals are often more convenient to use and calculate with, but some simple fractions yield recurring or complex decimals. Therefore, it is useful to be able to write and calculate with fractional numbers both ways.	Understanding why fractions need to have common denominators before ordering them	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		9	• To add and subtract fractions and mixed numbers				
		10	To multiply by a fraction or a mixed number by an integer				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		11	• To divide a unit fraction by an integer (explain reciprocal) • To divide an integer by a unit fraction (explain reciprocal)				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		12	• **RMP/Application: Bridge the gap**			Phase 8-11	Targeted learning based on trends
	What's the difference between percentage	13	• To make links between fractions, decimals and percentages		**Maths in real life**: Percentages are used in almost every area of life: in test marks; in banking services such as interest charge on loans or paid on savings	Understanding equivalent value Place value Dividing by 100 Multiplying by 100	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		14	• To convert percentages to fractions and decimals and vice versa				
		15	• To calculate a percentage of a quantity				

	increase and decrease?	**16**	• To express one quantity as a percentage of another			12x12 Time tables	Formative in class Address misconceptions Use of visualiser Oracy skills- think pair share
		17	• To increase quantities by a percentage				
		18	• To decrease quantities by a percentage				
		19	• To calculate the original amount, given the final amount				
		20	**RMP/Application: Bridge the gap**			Phase 13-19	Targeted learning based on trends
	What's the advantage of BIDMAS being universal?	**21**	• To use the conventions of BIDMAS to carry out calculations		**Maths in real life**: Various online platforms like Microsoft Excel, Google Sheets, spreadsheets and so on follow the BIDMAS rule of arithmetic to determine the order in which calculations in any given formula are to be performed.	Mental calculation techniques	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		22	• To work out the answers to problems with more than one mathematical operation				
		23	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Maths Comprehension
		24	**Revision session**				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		25	**Revision session**				

		26	**APPLICATION** – Assessment.				**Assessed piece** Deep mark
		27	**ASSESSMENT RMP**				Address misconceptions Live Marking

THE DEAN TRUST
Lord Derby Academy

LDA Mathematics
Curriculum Passport Year 8
Module 1 Number

Powerful Vocabulary

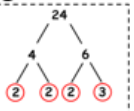
- Integers
- Mixed Number
- HCF
- LCM
- Percentages
- Improper
- Numerator
- Denominator
- Equivalent
- Multiplier

MathsWatch Clips

N19, N25, N130, N31, N41, N37, N42, N37, N15, N28, N29

Knowledge Recall

Memory
To write a number as a product of its primes, draw a tree, circle the primes. Then write the answer as a multiplication.



$24 = 2 \times 2 \times 2 \times 3$

$\frac{1}{2} \times \frac{1}{2} = \boxed{\frac{1}{4}}$

$\frac{3}{5} + \frac{1}{4} = \frac{12}{20} + \frac{5}{20} = \frac{17}{20}$

$\frac{3}{5} \div \frac{2}{7}$ $\quad \frac{3}{5} \times \frac{7}{2}$ $\quad \frac{21}{10}$ $\quad 2\frac{1}{10}$

Links To Other Subjects

Science, Computer Science, PE, Art, Geography and technology

Probing Questions?

- What number is a factor of all numbers?
- Why do we use all three representations of fraction, decimals and percentages.
- Is it possible to have more 100%?
- Why is decreasing by 46% the same as finding 54%?

Foundation	Developing	Secure	Advanced
• I can write down the multiples and factors of numbers less than 100. • I can add and subtract simple fractions. • I can multiply and divide simple fractions. • I can multiply or divide a number by a power of ten. • I can calculate a percentage of a particular amount. • I can work out the result of a percentage increase or decrease.	• I can find square and cube numbers and square and cube roots. • I can find common factors for pairs of numbers. • I can add and subtract simple fractions. • I can divide and divide simple fractions. • I can calculate a percentage of a particular amount. • I can write one value as a percentage of another value. • I can work out the result of a percentage increase or decrease.	• I can write a number as the product of its prime factors. • I can find the lowest common multiple (LCM) for pairs of numbers. • I can find the highest common factor (HCF) for pairs of numbers. • I can use the four operations mixed numbers fractions. • I can use a multiplier to calculate a percentage increase or decrease on a value. • I can write a change of value as a percentage increase or decrease.	• I can work out the LCM and the HCF of two numbers using prime factors. • I can add and subtract mixed numbers. • I can multiply or divide a fraction or a mixed number by an integer. • I can calculate or identify an increase of more than 100%. • I can use percentages to work out an original amount.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 2/6 w.c. 31st October 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Algebra • Substitution into formulae and expressions, including scientific formulae • Plot coordinates in all four quadrants • Draw a linear graph • Real life graphs • Quadratic, cubic and reciprocal graphs • Generate terms of a sequence and understand when a term is, or is not, part of a sequence • nth term of a linear sequence	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• Algebraic expression • Constant term • Coefficient • nth term • Fibonacci sequence • Linear graphs • Gradient • Intercept • Coefficient, • *y*-intercept, • $y = mx + c$ • Conversion graph • Parabola • quadratic • cubic • roots • turning point

National Curriculum

- Substitute values in expressions, rearrange and simplify expressions, and solve equations
- Understand and use standard mathematical formulae; rearrange formulae to change the subject
- Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- Work with coordinates in all four quadrants
- Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane
- Generate terms of a sequence from either a term-to-term or a position-to-term rule
- Recognise arithmetic sequences and find the nth term
- Recognise geometric sequences and appreciate other sequences that arise
- Reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	• Looking at architecture and engineering of buildings and bridges	Webinars - Student - Unifrog	Understanding the concept of fractions being part of whole numbers.	https://theday.co.uk/logged-out/

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 2/6 w.c. 30th October 2022	Key Knowledge *What will pupils know?*	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
	Where else do we use substitution?	1	• To substitute into, simplify and use algebraic expressions		**Maths in real life**: Scientists planning a mission to Mars or trying to land on a comet will use complex formulae and equations to simulate different paths for the spacecraft and choose the optimum. They can also use equations to model the effects of small changes and what might go wrong.	Know the basic language of algebra. Know how to collect together like terms.	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To substitute values into a variety of formulae				Formative in class Address misconceptions Oracy skills- think pair share
		3	• To change the subject of a formula				Formative in class Address misconceptions Oracy skills- think pair share
		4	• To solve equations involving one operation				
		5	• To solve equations involving two operations				
		6	• To recognise and draw the graph of a linear equations				
		7	• To recognise and draw the graph of a linear equations				
		8	• To work out the gradient in a graph from a linear equation				
		9	**RMP/Application: Bridge the gap**			Phases 1-8	Formative in class Visualiser comparison Live marking
		10	• To recognise and draw the graph from a simple quadratic equation		**Maths in real life**:	Know how to plot a graph	Formative in class Address misconceptions

	What are the advantages of using graphs to represent data?	**11**	• To recognise and draw the graph from a simple quadratic equation		Quadratic graphs are curved and these curves, known as parabolas, can be used to model many situations in science and economics. A tennis ball in flight will trace out a parabola. Strikers in football use maths to know how to kick the ball so that it will hit the target.	from a table of values. Have good calculator skills and know how to use the power button.	Live Marking Targeted questioning Oracy skills- think pair share
		12	• To solve a quadratic equation by drawing a graph				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		13	• To recognise and plot cubic and reciprocal graphs				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		14	• To learn how graphs can be used to represent real-life situations				
		15	• **RMP/Application: Bridge the gap**			Phase 10-14	Targeted learning based on trends
	Where have you seen patterns in everyday life?	**16**	To use the *n*th term of a sequence to generate missing terms		**Maths in real life**: Fibonacci numbers appear everywhere in nature, from the leaf arrangements in plants, to the pattern of the florets of a flower. They are applicable to the growth of every living thing, including a single cell, a grain of wheat, a hive of	Students should be familiar with the basic sequences such as even and odd numbers, and multiples of numbers up to 10.	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		17	• To use the *n*th term of a sequence to investigate if certain terms will be in the sequence				
		18	• To recognise and continue some special number sequences: square and triangular number				
		19	• To know and understand the Fibonacci sequence				Formative in class Address misconceptions Use of visualiser Oracy skills- think pair share

					bees, and even how rabbits breed!		
		20	**RMP/Application: Bridge the gap**			Phase 16-19	Targeted learning based on trends
		21	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Maths Comprehension
		22	**Revision session**				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		23	**Revision session**				
		24	**APPLICATION** – Assessment.				**Assessed piece** Deep mark
		25	**ASSESSMENT RMP**				Address misconceptions Live Marking

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LDA Mathematics
Curriculum Passport Year 8
Module 2 Algebra

Powerful Vocabulary

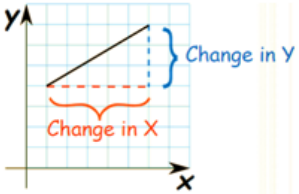
- Substitution
- Coefficient
- Linear
- Coordinates
- Variable
- Quadratic
- Cubic
- Gradient
- Intercept
- Nth Term

MathsWatch Clips

A11, A14, A21, N26, 98, 141

Knowledge Recall

$$Gradient = \frac{change\ in\ y}{change\ in\ x}$$



Nth Term of a sequence

5 8 11 14 17...

+3

The difference between these numbers goes here

3 n + 2

Links To Other Subjects

Science, Design and technology, ICT, Economics, PE

Probing Questions?

- What do you look for in a sequence to help you find the *n*th term?
- What does the gradient of the line tell us?
- What have you noticed about the graphs of functions of the form $y = mx + c$?

Foundation	Developing	Secure	Advanced
• I can use substitute numbers into simple expressions. • I can solve simple one step equations. • I can plot coordinates on a graph. • I can complete a table of values for a simple linear relationship and use this to draw a graph of the relationship. • I can draw and interpret distance-time graphs. • I can find the next terms of a sequence.	• I can use substitute numbers into simple expressions and formulae. • I can solve simple two step equations • I can complete a table of values for a simple linear relationship and use this to draw a graph of the relationship. • I can draw and interpret distance-time graphs that describe real-life situations. • I can find the nth term of a simple sequence.	• I can complete a table of values for a linear equation. • I can calculate the gradient of a straight line drawn on a coordinate grid. • I can work out an equation of the form y = mx + c from its graph. • I can complete a table of values for a simple quadratic equation. • I can draw and interpret graphs that illustrate real-life situations. • I can find the nth term of a sequence.	• I can solve complex linear equations. • I can calculate the gradient of a straight line drawn on a coordinate grid. • I can work out an equation of the form y = mx + c from its graph. • I can complete a table of values for a quadratic equation. • I can solve a quadratic equation using a graph and find its key points. • I can find the nth term of a quadratic sequence.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 8 Learning Sequence (Scheme of Work)

Year8: Module 3/6 Ratio Proportion	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Ratio and Proportion • Scale drawings • Ratio notation • Equivalent ratios and fractions • Direct and inverse proportion Algebra • Understand equivalence • Form/solve expressions and equations • Simplify and manipulate algebraic expressions • Inequalities and number lines • Solving Inequalities (linear)	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Cancel Common unit Simplest form Equivalent Percentage Quantity Direct proportion Inverse proportion Variation Balancing Solution Equation Expression Formula Identity Symbol Term Variable Brackets Expand Substitute Multiply Like terms

National Curriculum

- use scale factors, scale diagrams and maps
- draw and measure line segments and angles in geometric figures, including interpreting scale drawings
- use ratio notation, including reduction to simplest form
- divide a given quantity into two parts in a given part: part or part: whole ratio; express the division of a quantity into two parts as a ratio
- understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction
- solve problems involving direct and inverse proportion
- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- substitute values in expressions, rearrange and simplify expressions, and solve equations
- use algebraic methods to solve linear equations in one variable

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life	Knowledge of times tables 12 x 12, factors and multiples, basic understanding of ratio and proportion.	https://theday.co.uk/members-login/

Year 8 Learning Sequence (Scheme of Work)

Year8: Module 3/6 Ratio, Proportion and Algebra w.c. 5th January 2022

Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Ratio and Proportion; Can you use a recipe to bake enough cakes for the whole school?	1	• To introduce ratio notation • To use ratios to compare quantities		Ratios are used in bicycle gears to enable riders to tackle steep slopes, such as the Alpine stages of the Tour de France. A smaller gear ratio between the cogs connected to the pedals and those on the back wheel makes it easier to pedal uphill, whereas a larger gear ratio allows for more control downhill	Multiplication tables up to 12 × 12 How to simplify fractions How to find a fraction of a quantity How to multiply and divide, with and without a calculator	Formative in class Address misconceptions
	2 3	• To write a ratio as simply as possible				Formative in class Address misconceptions Targeted questioning Live marking
	4 5	• To use ratios to find missing quantities				Formative in class Visualiser comparison
	6 7	• To understand the connection between ratios and fractions.				Formative in class Visualiser comparison Live marking
	8	**RMP/Application: Bridge the gap**			Phases 1-7	Formative in class Visualiser comparison Live marking
	9 10 11	• To understand the meaning of direct proportion		The proportions of the parts of the human body change with age. For an average baby, the length of the head is about a quarter of the length of the whole body. For an average adult, it is about an eighth. Exact body	The multiplication tables up to 12 × 12 How to simplify fractions How to multiply and divide, with and without a calculator	Formative in class Address misconceptions Targeted questioning Live marking
	12 13	• To find missing values in problems involving proportion				Formative in class Address misconceptions

		14			ratios vary from person to person, and scientists have found that the 'ideal' body shape varies from one country and culture to another	How to substitute values into expressions How to solve simple algebraic equations	
		15	• To understand what is meant by inverse proportion				Formative in class Address misconceptions
		16	• To solve problems using inverse proportion				Formative in class Address misconceptions
		17					
		18					
		19	**RMP/Application: Bridge the gap**			Phases 9-18	Targeted learning based on trends
	Algebra; What is the advantage of using letters to represent unknown values?	**20**	• To understand what an equation is • To solve equations involving one operation		Scientists planning a mission to Mars or trying to land on a comet will use complex formulae and equations to simulate different paths for the spacecraft and choose the optimum. They can also use equations to model the effects of small changes and what might go wrong	The basic language of algebra Multiplications facts 12x12 Collect together like terms That addition and subtraction are opposite (inverse) operations That multiplication and division are opposite (inverse) operations.	Formative in class Address misconceptions Targeted questioning Live marking
		21	• To solve equations that include brackets				Formative in class Address misconceptions
		22					
		23	• To solve equations involving two operations				Formative in class Address misconceptions
		24					
		25	• To use algebra to set up and solve equations				Formative in class Address misconceptions
		26					
		27	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)			TBC	Focus TBC

		28	• To simplify algebraic expressions involving the four basic operations by combining like terms		In areas of science such as computer programming, algebra helps us write things simply and clearly	As above	Formative in class Address misconceptions
		29	**RMP/Application: Bridge the gap**			Phases 1-16	Targeted based on need
		30	• To solve a simple linear inequality and represent it on a number line		Inequalities can be set up to model mobile phone tariffs and systems to avoid vehicle collisions	The basic language of algebra How to collect together like terms How to solve basic linear equations How to substitute into formulae.	Formative in class Address misconceptions
		31	**APPLICATION** – Teacher assessment based on the content taught to date.			All phases to date	**Assessed piece** Deep mark

The Dean Trust
Lord Derby Academy

LDA Mathematics
Curriculum Passport Year 8
Module 3 Ratio, Proportion and Algebra

Powerful Vocabulary

- Direct proportion
- Proportional
- Variable
- Formula
- Graph
- Inverse proportion
- Value
- Equation
- Balance
- Subject
- Formula
- Solve

Knowledge Recall

Peter and Jayne share £40 in the ratio 3 : 5
How much does Peter get?

What fraction of the £40 does Peter get?

$\frac{3}{8}$

$$5x - 2 = 3x + 4$$
$$-3x \qquad -3x$$
$$2x - 2 = 4$$
$$+2 \qquad +2$$
$$2x = 6$$
$$x = 3$$

Probing Questions?

- Six apples cost 90p. How much do 8 cost?
- Three books cost £18. How much would 5 cost? Explain how you got your answer.

MathsWatch Clips

R8, R13,A12, A10, A19a, A19b, A13a, 138

Links To Other Subjects

Business studies, Science, Art, Design and Technology

Foundation	Developing	Secure	Advanced
• I can decide when two variables are in direct proportion and find a formula. • I can draw a graph for two variables in direct proportion. • I can solve simple equations involving brackets and fractions. • I can substitute values into formulae.	• I can find equivalent ratios and fractions • I can decide when two variables are in direct proportion or indirect proportion. • I can find a formula for two variables in direct proportion. • I can draw a graph for two variables in direct proportion. • I can solve simple equations involving brackets and fractions. • I can substitute values into formulae.	• I can recognise and draw a graph for two variables that are in direct proportion. • I can work out a formula connecting two variables that are in direct proportion. • I can solve equations involving brackets and fractions. • I can solve equations where the variable occurs on both sides. • I can change the subject of a formula in simple cases.	• I can work out a formula and draw a graph connecting two variables that are in direct and inversely proportional. • I can decide whether two variables are in direct or inversely proportional. • I can solve an equation involving brackets or a fractional coefficient. • I can solve equations where the variable occurs more than once and involving brackets. • I can change the subject of a formula

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 4/6 Geometry and	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Geometry and Measure • Angle facts Transformations • Single and combined transformations • Translation using 2D vectors • Use column representation of vectors Similarity • Similar Shapes (lengths only)	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Vertically opposite angles Equilateral, Isosceles. Right-angled, Scalene triangle Allied angles/ Co-interior angles/Supplementary angles Alternate angles Corresponding angles Transversal Order of rotational symmetry Rotational symmetry Image Object Transformation Translation Vector Mirror line Reflection Centre of rotation Rotation Centre of enlargement Enlargement Congruent Similar

National Curriculum

- Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles.
- Draw and measure line segments and angles in geometric figures.
- Understand and use the relationship between parallel lines and alternate and corresponding angles.
- Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.
- Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids.

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	• Financial Banking workshops • Women in Maths	• Architects	• To calculate angles on a straight line • To calculate angles around a point • To use vertically opposite angles • Reading and plotting coordinates in all four quadrants	https://theday.co.uk/logged-out/ Women in Maths

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 4/6 Geometry and measure w.c. 28th February 2022

Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Geometry and measure: How are angles used when building new houses or when buying a new kitchen?	**1**	• To construct accurate drawings of triangles, using a pair of compasses, a protractor and a straight edge		**Maths in real life**: Architects use the properties of angles and shapes to design buildings.	Using rulers to measure accurately	Formative in class Address misconceptions Support with the use of protractors
	2	• To recognise and calculate the angles in different sorts of triangle			Angles in triangles add up to 180°	Formative in class Address misconceptions
	3	• To calculate angles in parallel lines			Angles on straight lines add up to 180°	Formative in class Address misconceptions
	4	• To calculate angles in parallel lines				
	5	• To calculate angles in parallel lines				
	6	**RMP/Application: Bridge the gap**			Phases 1-5	Formative in class Visualiser comparison Live marking
Transformations: Why do tilers need to consider transformations?	**7**	• To work out the order of rotational symmetry for a 2D shape		**Maths in real life**: Decorative patterns on clothes, curtains, furniture fabric, carpets and wallpaper usually make use of symmetry to produce a repeated pattern, where a	2D shape names and basic properties How to use tracing paper	Formative in class Address misconceptions Live Marking Targeted questioning
	8	• To recognise shapes with rotational symmetry				
	9	• To translate a 2D shape				
	10	• To reflect a 2D shape in a mirror line				
	11	• To rotate a 2D shape about a point				

		12	• To enlarge a 2D shape by a scale factor		base unit can be copied forever. There are just 17 different types of repeating design, depending on the symmetry used.	Times table and division facts	
		13	• To use more than one transformation			Plotting co-ordinates in all four quadrants	Formative in class Visualiser comparison
		14	• To use more than one transformation				
		13	**RMP/Application: Bridge the gap**			Phase 7 -14	Targeted learning based on trends
		14	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Women in Maths to celebrate International Women's Day
	Similarity: What's the difference between congruent shapes and similar shapes?	15	To demonstrate that two triangles are congruent		**Maths in real life:** Astronomers use the geometry of similar triangles to measure the distance to nearby stars. They use Earth's orbit around the sun to calculate the maximum distance between two measurements. They observe the same star twice, from the same point on Earth and at the same time of	Measuring sides and angels accurately	Formative in class Address misconceptions Use of visualiser
		16	To demonstrate that two triangles are congruent				
		17	To demonstrate that two triangles are congruent				
		18	To recognise similarity in any two shapes			Multiplication and division facts	Formative in class Address misconceptions
		19	To recognise similarity in any two shapes				
		20	To show that two shapes are similar				
		21	To work out the scale factor between similar shapes				Formative in class Visualiser comparison
		22	To work out the scale factor between similar shapes				
		23	**RMP/Application: Bridge the gap**			Phase 15-22	Targeted learning based on trends

		28	**APPLICATION** – Teacher assessment based on the content taught to date.		day, but six months apart.	Phases 1-22	**Assessed piece** Deep mark

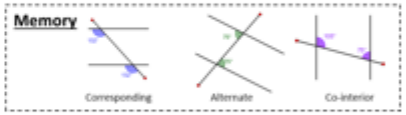
THE DEAN TRUST
Lord Derby Academy

LDA Mathematics
Curriculum Passport Year 8
Module 4 Angles, Transformations and Similar Shapes

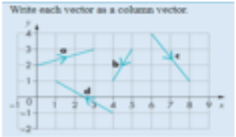
Powerful Vocabulary

- Alternate
- Co-interior
- Corresponding
- Parallel
- Perpendicular
- Transformations
- Translation
- Rotation
- Enlargement
- Reflection

Knowledge Recall



$$\begin{pmatrix} x \\ y \end{pmatrix}$$



Probing Questions?

- What properties do all quadrilaterals share?
- When is a polygon regular?
- What transformations can bring a transformed image back to its starting point?

MathsWatch Clips

G5, G14, G18, G28, G26C, R10, 11, 50, 48, 49, 50, 148, 174

Links To Other Subjects

Science, Engineering Art, Design and Technology, Geography, PE

Foundation	Developing	Secure	Advanced
• I can identify parallel and perpendicular lines. • I can recognise that the sum of the angles in a triangle is 180°. • I can translate a point or a 2D shape. • I can recognise and describe rotational symmetry. • I can reflect a 2D shape in a given mirror line.	• I can identify parallel and perpendicular lines. • I can recognise that the sum of the angles in a triangle is 180°. • I can translate a point or a 2D shape. • I can rotate a 2D shape. • I can translate a 2D shape by a given vector. • I can describe a rotation of a given 2D shape around a given point through any angle.	• I can work out the scale factor between two similar shapes. • I can solve problems using similar shapes. • I can enlarge a 2D shape about any point using a positive fractional scale factor. • I can recall the geometric properties of quadrilaterals. • I can rotate a shape about a given centre of rotation on a coordinate grid. • I can construct perpendicular lines and bisect angles.	• I can construct perpendicular lines and bisect angles. • I can calculate angles in parallel lines. • I can enlarge a 2D shape by a given scale factor. • I can construct a triangle using a compass and ruler. • I can add and subtract vectors. • I can enlarge a 2D shape about any point using a positive fractional scale factor.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 5/6 Number and Geometry	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Integers, Negative numbers, Decimals • Place value • Rounding and estimation Area, Perimeter and Volume • Units of measure • Area, perimeter and volume, including compound shapes • Problems involving area, perimeter and volume (including money problems)	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Greater than Less than Integer Negative number Positive number Metric units Perimeter Area Length Width Compound shape Perpendicular height Base Formula Rectangle Square Parallelogram Trapezium π (pi) Arc Chord Circumference Diameter Radius Sector Segment Tangent

National Curriculum

- Understand and use place value for decimals, measures and integers of any size.
- Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a<x\leq b$.
- Use standard units of mass, length, time, money and other measures, including with decimal quantities.
- Change freely between related standard units [for example time, length, area, volume/capacity, mass].
- Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).
- Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes.

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	• Financial Banking workshops		Basic numeracy skills covered at KS2 and in year 7. Understanding the meaning of estimating, perimeter and area.	https://theday.co.uk/logged-out/

Year 8 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 8: Module 5/6 Number and Geometry w.c. 25th April 2022	**Can Integers be decimals or fractions?** **Can decimals and fractions ever be negative?**	**1**	• To compare and order positive and negative numbers, including decimals		**Maths in real life**: Abacuses can be used – with practice – to carry out calculations quickly and accurately. There are different types: the Chinese abacus has two 'five-unit' beads and five 'single-unit' beads per row, whereas the Japanese abacus has one 'five-unit' bead and four 'single-unit' beads per row.	How to write and read whole numbers How to add and subtract positive numbers Multiplication tables up to 12×12 How to multiply and divide whole numbers	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To solve problems involving negative temperatures, including decimals				Formative in class Address misconceptions Oracy skills- think pair share
		3	• To carry out additions and subtractions involving negative numbers, including decimals				Formative in class Address misconceptions Oracy skills- think pair share
		4	• To carry out multiplications and divisions involving negative numbers, including decimals				
		5	• To use inequalities with negative numbers				
		6	**RMP/Application: Bridge the gap**			Phases 1-5	Formative in class Visualiser comparison Live marking

	What's the difference between rounding to 1 sf and to 1 dp?	7	• To round numbers to the nearest whole number 10, 100 or 1000		**Maths in real life**: The term 'ball park' figure for an estimate originates with US newspapers reporting on attendances at baseball games. They tend to round numbers to the nearest thousand to give an approximate value that is close enough to give a good idea of the number of people in the 'ball park'.	How to multiply and divide by 10 and 100 Understand inequality sings	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		8	• Round decimal numbers to a given accuracy				
		9	• Identify significant figures • Round numbers to a given number of significant figures				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		10	• Use approximation to estimate answers and check calculations				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		11	• How to find the limits of numbers rounded to a given accuracy				
		12	• **RMP/Application: Bridge the gap**			Phase 7 -11	Targeted learning based on trends
	Why do we use the perpendicular height in area formula?	13	• To convert between common metric units		**Maths in real life**: Perimeter and area rely on an understanding of basic measurements. *Perimeter* comes from the Greek *peri* (all around) and *meter* (measure), so the perimeter of a shape is the	What 'area' means Know what perimeter means The common units of length and area Times tables 12x12	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		14	• To calculate the perimeter and area of a rectangle				
		15	• To calculate the perimeter and area of a compound shape made from rectangles				
		16	• To calculate the area of a triangle • To use the formula for the area of a triangle				Formative in class Address misconceptions

		17	• To calculate the area of a parallelogram • To use the formula for the area of a parallelogram		length around its edge. Area is a measure of the amount of surface covered and is measured in square units.		Use of visualiser Oracy skills- think pair share
		18	• To calculate the area of a trapezium • To use the formula for the area of a trapezium				
		19	**RMP/Application: Bridge the gap**			Phase 13-18	Targeted learning based on trends
	What do perimeter and circumference have in common?	20	• To recognise terms used for circle work • To calculate the circumference of a circle		**Maths in real life**: The circumference of a round table is measured to work out how many people can sit at a table. This is very useful when planning a wedding.	Basic calculator knowledge Rounding decimals up to 2 dp	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		21	• To calculate the area of a circle				
		22	• To give answers for circle calculations in terms of π				
		23	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Maths Comprehension
		24	Revision lesson			Recap	Formative in class Visualiser comparison Oracy skills- think pair share
		25	Revision lesson			Recap	
		26	**APPLICATION** – Teacher assessment based on the content taught to date.			Phases 1-25	**Assessed piece** Deep mark

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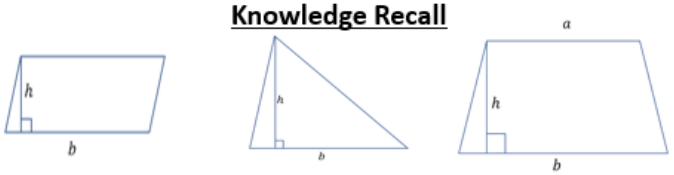
LDA Mathematics
Curriculum Passport Year 8
Module 5 Number and Geometry

Powerful Vocabulary

- Base/Height
- Compound Shape
- Parallelogram
- Square Units
- Proportion
- Formula
- Trapezium
- Circumference
- Radius
- Diameter

Knowledge Recall



$A = b \times h$ $\quad A = \frac{b \times h}{2}$ $\quad A = \frac{1}{2}(a + b) \times h$

Circles: $A = \pi r^2$ $\quad C = \pi d$

Probing Questions?

- Why do we find the area of a parallelogram by multiplying the base by the perpendicular height?
- If you are given the circumference of a circle how do you calculate the radius?

MathsWatch Clips

G2 G20, G21, G22, G24, G25, N7

Links To Other Subjects

Science, PE, Art, Design and technology

Foundation	Developing	Secure	Advanced
• I can work out the area of any rectangle. • I can work out the area of any triangle. • I can work out the area of any parallelogram. • I know the names of the parts of a circle. • I can measure the radius and diameter of a circle.	• I can work out the area of a simple compound shape. • I can work out the area of any parallelogram or a trapezium. • I can measure the radius and diameter of a circle. • I can calculate the circumference of a circle. • I can calculate the area of a circle.	• I can use the appropriate formulae to find the area of triangles, parallelograms and trapezia. • I can work out the area of compound shapes. • I can use the correct formula to work out the area or circumference of a circle. • I can calculate the radius or diameter if I am given the circumference of a circle.	• I can use the appropriate formulae to find the area of triangles, parallelograms and trapezia. • I can calculate the area of complex compound shapes. • I can use the correct formula to work out the area or circumference of a circle. • I can calculate the radius or diameter if I am given the area or circumference of a circle. • I can calculate the perimeter and area of more complex shapes that include circles.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 6/6 Geometry, Data & Probability	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Geometry and Measure • Ruler and Compass constructions Data • Charts, tables and diagrams • Compare data sets • Averages Probability • Exhaustive probabilities • Single event probability • Diagrams to calculate probabilities • And /Or Rule	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• Compass • Protractor • Ruler • Construct • Included angle • Angle bisector • Perpendicular bisector • Equidistant • Loci (locus) • *Equally likely* • *Event* • *Outcome* • *Probability* • *Probability fraction* • *Probability scale* • *Random* • *Trial* • *Exhaustive* • *Mutually exclusive* • *Experimental data* • *Experimental probability* • *Relative frequency* • *Theoretical probability*

National Curriculum

- Derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line
- Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)
- Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data
- Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
Key Stage 3 Club Engineers for the future Higher achievers club	• Financial Banking workshops		Basic numeracy skills covered at KS2 and in year 7. Understanding the meaning of estimating, perimeter and area.	https://theday.co.uk/logged-out/

Year 8 Learning Sequence (Scheme of Work)

Year 8: Module 6/6 Geometry, Data & Probability Week of he 6th June 2022

Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
	1	• To construct accurate drawings of triangles, using a pair of compasses, a protractor and a straight edge		**Maths in real life**: Loci have a range of practical applications including helping to decide on suitable routes for a new train line.	Measuring with rulers accurately.	Formative in class Address misconceptions Oracy skills- think pair share
	2	• To construct the bisectors of lines and angles				Formative in class Address misconceptions Oracy skills- think pair share
	3	• To construct angles of 60° and 90°				Formative in class Address misconceptions Oracy skills- think pair share
	4	• To draw a locus for a given rule				
	5	**RMP/Application: Bridge the gap**			Phases 1-4	Formative in class Visualiser comparison Live marking
	7	• To use tally charts and frequency tables to collect and represent data		**Maths in real life**: Statistical data appears every day in the news, with graphs and charts used to organise, interpret and assess this. Being able to assess the charts and graphs that other people present – and the conclusions that can and can't be drawn – is an important skill.	Interpret and construct simple pictograms, tally charts, bar charts and time graphs. interpret and construct pie charts and line graphs and use these to solve problems.	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
	8	• To draw bar charts and vertical line charts to represent statistical data				
	9	• To draw pictograms to represent statistical data				Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
	10	• To draw and interpret pie charts				Formative in class Address misconceptions Live Marking Targeted questioning
	11	• To read scatter graphs To understand correlations				

							Oracy skills- think pair share
			• To use the median and range to compare data				
		12	• **RMP/Application: Bridge the gap**			Phase 7 -11	Targeted learning based on trends
		13	• To know and use the 0–1 probability scale		**Maths in real life**: Real-time probability calculations can be used by scientists to predict the paths of natural disasters and take preventative measures.	KS2 doesn't teach probability. In year 7 pupils work on key vocabulary and probability scales recap.	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		14	• To work out probabilities based in equally likely outcomes				
		15	• To learn about and understand experimental probability				
		16	• To understand the difference between theoretical and experimental probability				Formative in class Address misconceptions Use of visualiser Oracy skills- think pair share
		17	• To decide if an event is fair or biased				
		18	• To recognise mutually exclusive events				
		19	**RMP/Application: Bridge the gap**			Phase 13-18	Targeted learning based on trends
		20	• To use a sample space to calculate probabilities		**Maths in real life**: Probability is used in weather forecasting to combine the chances of different indicators of rain to come up	KS2 doesn't teach probability. In year 7 pupils work on key vocabulary and probability scales recap.	Formative in class Address misconceptions Live Marking Targeted questioning Oracy skills- think pair share
		21	• To understand frequency tree diagrams and probability tree diagrams				
		22	• To use probability tree diagrams to work out the probabilities involved in combined events. P(A or B) = P(A) + P(B)				

					with an overall probability		
		23	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Maths Comprehension
		24	**APPLICATION** – End of year assessment. Whole year revision and intervention of weak topics. Getting ready for end of year assessments.				**Assessed piece** Deep mark
		25					
		26					
		27					
		28					
		29					
		30					
		32					

Year 9 Learning Sequence (Scheme of Work)

Year 9: : Module 1/6 w.c. 5th September 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Number • Directed number • Powers, Factors, Multiples, Primes and Roots • Indices (index rules) • Standard Form Algebra • Form/solve expressions and equations • Change the subject of the formulae • Substitution into formulae and expressions, including scientific formulae • Plot coordinates in all four quadrants	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• Brackets • Powers/Index/Indices • Square Roots • Cube Roots • Standard Form • Place Value • Estimate • Significant figure • Rounding • Error • Inequality notation • Coefficient • Substitution • Re-arrange • Subject • Simplify • Expression • Formula/Formulae • Like terms • Collect • Equation • Solve • Product • Factors • Expand • Binomials • Co-ordinates • Quadrants • Axis

National Curriculum

- Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations
- Interpret and compare numbers in standard form A x 10n 1≤A
- Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]
- Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation a<x≤b

Pupils should be taught to:

- use and interpret algebraic notation, including:
  - ab in place of $a \times b$
  - $3y$ in place of $y + y + y$ and $3 \times y$
  - a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$
  - $\frac{a}{b}$ in place of $a \div b$
  - coefficients written as fractions rather than as decimals
  - brackets
- Substitute numerical values into formulae and expressions, including scientific formulae
- Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- Simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms , multiplying a single term over a bracket , taking out common factors , expanding products of two or more binomials
- Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)
- Understand and use standard mathematical formulae; rearrange formulae to change the
- Work with coordinates in all four quadrants

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life	KS2 National Curriculum, Year 7 and Year 8 curriculum	https://theday.co.uk/members-login/

Year 9 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 9: : Module 1/6 w.c. 5th September 2022	How do we use inequality signs when we book a party without knowing exact number of guests?	1	• To use inequalities with negative numbers		**Maths in real life**: The origins of our decimal number and counting systems. The Roman number system is based on the numbers 5 and 10.	Less than sign More than sign Equal sign Negative numbers in real life (temperature) Multiplication and division sign rules	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To compare and order positive and negative numbers.				Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		3	• To work out the answers to problems with more than one mathematical operation				
		4	• To use the four rules of arithmetic with integers and decimals.				
		5	**RMP: Bridge the gap**			Phases 1-4	
	Why do scientist need to use numbers in Standard Form for	6	• To write a number as a power of another number		**Maths in real life**: Using standard form to write very large or very small numbers reduces the chances of transcription errors in calculations: being out by a factor of 10 when doing a calculation	Multiplying and dividing by powers of 10 Place value	Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		7	• To use powers (also known as indices)				
		8	• To multiply and divide by powers of 10				
		9	• To use rules for multiplying and dividing powers				

	their calculations?	**10**	• To write a number in standard form		about space travel would be disastrous!		
		11	• To understand and work with standard form, using both positive and negative powers of ten				
		12	• **RMP: Bridge the gap**			Phases 6-11	
	What are the advantages and disadvantages of rounding to significant figures?	**13**	• To identify significant figures and round numbers to a given number of significant figures		**Maths in real life**: The term 'ball park' figure for an estimate originates with US newspapers reporting on attendances at baseball games. They tend to round numbers to the nearest thousand to give an approximate value that is close enough to give a good idea of the number of people in the 'ball park'.	Multiplying and dividing by powers of 10	Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		14	• To use approximation to estimate answers and check calculations			Rounding to nearst 10,100,1000, 1dp, 2dp, 3dp	
		15	**RMP: Bridge the gap**			Phases 13-14	Formative in class
		16	• To write an algebraic expression • To recognise expressions, equations, formulae and identities		**Maths in real life**: Mathematics is a universal language, and algebra is this language's expression. From early Arabic roots,	Mental calculations 12x12 Times tables Literacy- key words	Formative in class Address misconceptions Targeted questioning Live marking
		17	• To substitute into, simplify and use algebraic expressions and formulae				

	What are the advantages of generalising rules?	**18**	• To expand brackets such as $2(x - 3)$ and simplify		the use of symbols development until the middle of the 17th century, when René Descartes.	Multiplication and division sign rules Inverse operations	Oracy skills- think pair share
		19	• To factorise an algebraic expression				
		20	• To expand two linear brackets to obtain a quadratic expression				
		21	• To factorise a quadratic expression of the form $x2 + ax + b$ into two linear brackets				
		22	• To change the subject of a formula				
		23	• To solve linear equations such as $3x - 1 = 11$ where the variable only appears on one side				
		24	• To use inverse operations and inverse flow diagrams				
		25	• To solve equations by balancing				
		26	• To solve equations in which the variable (the letter) appears in the numerator of a fraction				
		27	• To solve equations where you have to first expand brackets				
		28	• To solve equations where the variable appears on both sides of the equals sign.				

		29	**RMP: Bridge the gap**			Phases 16-28	
		30	• **Flexi lesson** – Mathematics reading for comprehension Literacy resource.				Focus TBC
	How do satnavs in cars know how to plan routes to different destinations ?	31	• To understand and use coordinates to locate points in all four quadrants		**Maths in real life**: Understanding the nature of different equations and the effect of changing variables in them allows designers, engineers and developers to model real life scenarios on computers, and show movement on screen.	Plotting co-ordinates Substitution Looking for patterns and sequences	Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		32	• To recognise and draw line graphs with fixed values of *x* and *y*				
		33	• To recognise and draw the graph from a simple quadratic equation				
		34	**APPLICATION** –Assessment.				**Assessed piece** Deep mark, question level analysis
		35	**ASSESSMENT RMP**				Address misconceptions Live Marking

The Dean Trust
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LDA Mathematics
Curriculum Passport Year 9
Module 1 Number and Algebra

Powerful Vocabulary

- Negative
- Factor Tree
- Prime Factor
- Index Notation
- Standard Form
- Rearrange
- Inverse
- Expand
- Factorise
- Solve

Knowledge Recall

$x^a \times x^b = x^{a+b}$

$x^a \div x^b = x^{a-b}$

To expand a bracket multiply by the outside term.

$5(a-2)$

$5a - 10$

To factorise you put the expression back into brackets using HCF.

Factorising
$= 8n^2 + 20n$
$4n(2n + 5)$
Highest Common Factor

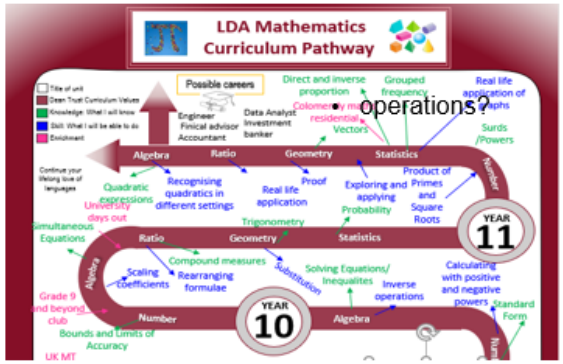
Standard form

$a \times 10^b$

where a is a number between 1 and 10

Probing Questions?

- Why does a negative number that has an odd number as a power, always give a negative answer?
- Prove the value of any number to the power 0 is 1?
- How large does a number have to be before it becomes more useful to write it in standard form?
- What is the advantage of using inverse operations?



MathsWatch Clips

A8,A9,A10,A12, A19 ,A13, 29, 30, 82, 83 93 131, 134,

Links To Other Subjects

Science, Statistics, Geography, Design and Technology

Foundation	Developing	Secure	Advanced
• I can multiply and divide by powers of 10. • I can recognise multiples of the first ten whole numbers. • I can find factors of numbers less than 100. • I can recognise two-digit prime numbers. • I can expand brackets. • I can factorise simple algebraic expressions. • I can substitute into simple formulae.	• I can work out the prime factors of numbers. • I can write and calculate with numbers written in index form. • I can write ordinary numbers in standard form and vice versa. • I can factorise algebraic expressions. • I can substitute into simple formulae. • I can use inverse operations to solve equations solve equations.	• I can multiply and divide numbers written in index form. • I can multiply and divide negative numbers • I can expand double brackets. • I can solve equations that have brackets or fractions or both. • I can rearrange formulae. • I can write ordinary numbers in standard form and vice versa. • I can use standard form to calculate in various problems.	• I can expand more complex expressions containing brackets. • I can factorise algebraic expressions containing powers of variables. • I can solve equations with the variable in the denominator of a fraction. • I can expand and factorise expressions containing several variables. • I can rearrange more complex problems. • I can use standard form in calculation involving various complex problems.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 9 Learning Sequence (Scheme of Work)

Year 9: : Module 2/6 w.c. 30th October 2022

Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
Algebra • Draw and interpret a linear graph • Real life graphs • Quadratic, cubic and reciprocal graphs • Gradients, y intercept and the equation of a line (y=mx + c) • Inequalities and number lines • Interpret inequalities (values represented by an inequality) • Solving Inequalities (linear) • Simultaneous Equations (linear)	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• Linear graphs • Parallel • Gradient • Coefficient • Constant term • Intercept • *y = mx + c* • Parallel • Conversion graph • Co-ordinates • Quadrants • Axis • Inclusive inequality • Inequality • Strict inequality

National Curriculum

- Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane
- Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations
- Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life Webinars - Student - Unifrog	KS2 National Curriculum, Year 7 and Year 8 curriculum	https://theday.co.uk/members-login/

Year 9 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 9: : Module 2/6 w.c. 30th October 2022	What are the advantages of using graphs?	1	• To learn how graphs can be used to represent real-life situations		**Maths in real life**: Quadratic graphs are curved and these curves, known as parabolas, can be used to model many situations in science and economics. A tennis ball in flight will trace out a parabola. Strikers in football use maths to know how to kick the ball so that it will hit the target.	Know how to substitute numbers into a formula Know how to plot a graph from a table of values. Read and plot coordinates Substitute into simple algebraic functions. Be familiar with $y = mx + c$, and measuring gradients.	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To work out the equation of a linear graph that is parallel to another line and passes through a specific point				
		3	• To draw and use real-life graphs				Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		4	• To read and draw distance-time graphs				
		5	• To recognise and draw the graph from a simple quadratic equation				
		6	• To draw exponential growth graphs				
		7	• To recognise and plot cubic and reciprocal graphs				
		8	**RMP: Bridge the gap**			Phases 1-7	
	What are the differences between equations	9	• To solve a simple linear inequality and represent it on a number line		**Maths in real life**: When people plan parties and book function rooms they will use inequalities. For example: the room can hold more than 20	Solve linear equations, including those with the variable occurring on both sides of the equation.	Formative in class Address misconceptions Targeted questioning Live marking
		10	• To solve a simple linear inequality and represent it on a number line				
		11	• To solve a simple linear inequality and represent it on a number line				

	and inequalities?	**12**	• To solve a pair of simultaneous equations graphically		people but less or equal to 50 people.	Place a number on a number line accurately.	Oracy skills- think pair share
		13	• To solve a pair of simultaneous equations graphically				
		14	• To solve a pair of simultaneous equations graphically				
		15	• **RMP: Bridge the gap**			Phases 9-14	
	What is the difference between two equations and two equations that are simultaneous?	**16**	• To solve simultaneous linear equations in two variables using the elimination method		**Maths in real life**: Linear graphs can be used to model two variables that increase at a constant rate, for example, the hourly cost of hiring a removals van.	Be able to substitute into simple algebraic functions. Know how to draw a line using the gradient-intercept method. Know how to find the gradient of a straight line.	Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		17	• To solve simultaneous linear equations in two variables using the elimination method				
		18	• To solve simultaneous linear equations in two variables using the elimination method				
		19	• To solve problems using simultaneous linear equations				
		20	• To solve problems using simultaneous linear equations				
		21	**RMP: Bridge the gap**			Phases 16-20	Formative in class
		22	• **Flexi lesson** – Mathematics reading for comprehension Literacy resource.				Focus TBC
		23	**APPLICATION** –Assessment				**Assessed piece**
		24	**ASSESSMENT RMP**				Address misconceptions Live Marking

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LDA Mathematics
Curriculum Passport Year 9
Module 2 Algebra

Powerful Vocabulary

- Linear graphs
- Parallel
- Gradient
- Coefficient
- Intercept
- Quadratic
- Exponential
- Inclusive inequality
- Inequality
- Strict inequality

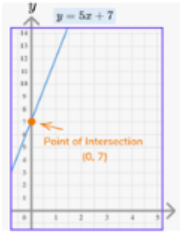
MathsWatch Clips

A14, A15, A21, A24, A28

Knowledge Recall

$y = mx + c$

gradient y-intersect



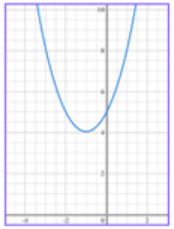
$<$ $\leq$ $>$ $\geq$

Less than | Less than or equal to | Greater than | Greater than or equal to

Plotting quadratic graphs involves drawing a table of values for the x and y coordinates of a quadratic function, and then plotting these on a set of axes.

E.g.
$y = x^2 + 2x + 5$

x	-3	-2	-1	0	1	2
y	8	5	4	5	8	13



Links To Other Subjects

Science, Design and technology, Physical education

Probing Questions?

- What does the gradient of a straight line segment in a distance-time graph tell us?
- What could be the equation(s) of a graph that passes through (0, 1)?
- Why could a quadratic have no/one/two solution(s)?

Foundation	Developing	Secure	Advanced
• I can substitute values into expressions to find coordinates. • I can complete a table of values for a simple linear relationship and use this to draw a graph of the relationship. • I can draw and interpret graphs that illustrate real-life situations. • I can represent inequalities on a number line.	• I can complete a table of values for a linear equation and use this to draw a graph of the equation. • I can plot simple quadratic equations. • I can calculate the gradient of a straight line drawn on a coordinate grid. • I can draw and interpret distance-time graphs that describe real-life situations. • I can represent inequalities on a number line. • I can solve simple linear inequalities.	• I can interpret more complex time graphs. • I can solve simple quadratic equations by drawing a graph. • I can solve problems from data that gives a quadratic graph. • I can find the equation of a straight line in the form y = mx + c • I can solve multiple step linear inequalities and represent the solution on a number line.	• I can draw exponential growth graphs of the form y = a × bx. • I can solve a pair of simultaneous equations by graph. • I can use a graph to solve a quadratic equation. • I can draw a graph for a cubic equation. • I can solve more complex inequalities such as quadratics and represent the solutions on a graph.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 9 Learning Sequence (Scheme of Work)

Ye Year 9: Module 3/6 w.c. 5th January 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Geometry and Measure • Angle facts (including angles in parallel lines) • Interior and Exterior angles of polygons (including regular polygons) • Bearings Algebra • Generate terms of a sequence and understand when a term is, or is not, part of a sequence • nth term of a linear sequence Data • Charts, tables and diagrams Number • Percentages • Percentage problems • Compound Interest and Depreciation	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Angles; straight lines, at a point, allied, alternate and corresponding angles Interior and exterior angle Polygon Bearing Three-figure bearing Pattern Sequence Consecutive nth term Difference Term-to-term Position-to-term Arithmetic sequence Linear sequence Geometric sequence Powers of 2, 10 Quadratic sequence Equivalent Percentage Quantity percentage change Percentage increase/decrease Percentage loss/profit

National Curriculum

- Understand and use the relationship between parallel lines and alternate and corresponding angles
- Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
- Understand and use the relationship between parallel lines and alternate and corresponding angles
- Derive and use the sum of angles in a triangle, deduce the angle sum in any polygon and to derive properties of regular polygons
- Generate terms of a sequence from either a term-to-term or a position-to-term rule
- Recognise arithmetic sequences and find the nth term
- Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data
- Define percentage as ‘number of parts per hundred’, interpret percentages as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%
- Interpret fractions and percentages as operators
- Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest.

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life	Knowledge of times tables 12 x 12, factors and multiples, basic understanding of ratio and proportion.	https://theday.co.uk/members-login/

Year 9 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 9: Module 3/6 w.c. 5th January 2022	Geometry and Measure; What is the difference between vertically opposite angles and alternate angles?	1	• To calculate angles on a straight line • To calculate angles around a point • To use vertically opposite angles		The degree originates with the ancient Babylonian unit angle. It is thought this was derived from using the property of a hexagon inscribed in a circle to divide the circle into six equal parts. They divided one angle of the subsequent equilateral triangle into 60 equal parts, which we now call degrees.	The meaning of the terms 'acute', 'obtuse', 'reflex', 'right' and how to use these terms to describe angles The names and angle properties of quadrilaterals How to use three-letter notation to describe any angle What a polygon is and the names of polygons with up to ten sides That a diagonal is a line joining two non-adjacent vertices of a polygon the meaning of the terms 'parallel' and 'perpendicular' in relation to lines	Formative in class Address misconceptions
		2	• To recognise and calculate the angles in different sorts of triangle				Formative in class Address misconceptions Targeted questioning Live marking
		3	• To calculate the sum of the interior angles in a polygon				
		4	• To calculate the exterior angles and the interior angles of a regular polygon				Formative in class Visualiser comparison
		5					
		6	• To calculate angles in parallel lines				Formative in class Visualiser comparison Live marking
		7					
		8	• To use a bearing to specify a direction		A bearing provides a direction given as the primary compass direction (north or south), degree of angle, and an east or west designation. A bearing describes a line as		Formative in class Address misconceptions Targeted questioning Live marking

					heading north or south, and deflected some number of degrees toward the east or west.		
		9	**RMP/Application: Bridge the gap**			Phases 1-8	Formative in class Visualiser comparison Live marking
	Algebra; How do builders know how many tiles they need for each style of pattern?	**10**	• To recognise patterns in number sequences and how they are built up		The Fibonacci sequence is a famous example of a mathematical pattern found in nature. Explore how the sequence is formed and look at real-world examples of the sequence, from rabbits breeding to the arrangement of seeds in a sunflower head.	How to substitute numbers into an algebraic expression How to state a rule for a simple linear sequence in words	Formative in class Address misconceptions Targeted questioning Live marking
		11 **12**	• To generate sequences, given the *n*th term				
		12	• To recognise and continue some special number sequences				Formative in class Address misconceptions
		13	• To understand how prime, odd and even numbers interact in addition, subtraction and multiplication problems				
		14	• To find the *n*th term from practical problems involving sequences				
		15	**Flexi lesson** (a module enhancing lesson - literacy focus including comprehension.)				Focus TBC
	Data; Why is the mean from a grouped frequency table an estimate?	**16**	• To draw and interpret pie charts		Scatter diagrams plot points from two sources to see if connections can be seen between two sets of data. They came into their own during the great energy debate of the late 1960s	How to draw and interpret pictograms, bar charts and line graphs How to extract information from tables and diagrams How to plot coordinates	Formative in class Address misconceptions
		17	To draw, interpret and use scatter diagrams To draw and use a line of best fit				
		18	• To identify the modal group				

			• To calculate an estimate of the mean from a grouped table		when prices and sales of gas and electricity were being studied, and pressure exerted for people to switch to using more electricity than gas.	How to work out the mode, the median, the mean and the range of a set of data	
		19	**RMP/Application: Bridge the gap**			Phases 9-18	Targeted learning based on trends
	Number; Would you rather have your bank pay you with simple interest or compound interest?	**20**	• To convert percentages to fractions and decimals and vice versa • To calculate a percentage of a quantity		Percentages are used in almost every area of life: in test marks; in banking services such as interest charge on loans or paid on savings; by governments to communicate what is happening to unemployment rates or the cost of living	The multiplication tables up to 12 × 12 How to simplify fractions How to multiply and divide, with and without a calculator How to substitute values into expressions	Formative in class Address misconceptions Targeted questioning Live marking
		21	• To increase and decrease quantities by a percentage				Formative in class Address misconceptions
		22	• To express one quantity as a percentage of another • To work out percentage change				
		23 **24**	• To calculate simple interest • To calculate compound interest				Formative in class Address misconceptions
		25	**RMP/Application: Bridge the gap**			Phases 1-24	Targeted based on need
		26	**APPLICATION** – Teacher assessment based on the content taught to date.			All phases to date	**Assessed piece** Deep mark

The Dean Trust
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LDA Mathematics
Curriculum Passport Year 9
Module 3 Geometry, Algebra and Number

Powerful Vocabulary

- Polygon
- Tessellation
- Regular polygon
- Irregular polygon
- Angles at a point
- Exterior angle
- Interior angle
- Straight line
- Annual rate
- Compound interest
- Simple interest
- Nth Term
- Term to term
- Position to term

Knowledge Recall

Exterior angle of a polygon:

$exterior = \frac{360}{\quad}$

Sum of interior angles of a polygon:

$sum\ of\ interior = (\quad) \times 180$

Increase £120 by 15%

We can think of the £120 as the original 100%.

Want the original price and an extra 15%.

That is 100% + 15% = 115%

The multiplier for 115% is 1.15

So 1.15 x 120 = 138

Probing Questions?

- What clues do you look for when solving a geometrical problem?
- What is the difference between simple interest and compound interest?
- As a single decimal multiplier, what would an increase of 4% per year be after three years for simple interest and compound interest?

MathsWatch Clips

G11, G19, G17/ G14, 12a, 123, 110, 111, 164, 103, 104, 141

Links To Other Subjects

Geography, Design and technology , Physical education, Science, Art

Foundation	Developing	Secure	Advanced
• I can name different polygons. • I can recognise regular, irregular, polygons. • I can work out the size of each interior angle for some regular polygons. • I can substitute numbers into an nth-term rule for a linear sequence.	• I can recognise regular, irregular, convex and concave polygons. • I can work out the sum of the interior angles for different polygons. • I can work out the size of each interior angle for different regular polygons. • I can work out simple interest problems. • I can solve reverse percentage problems	• I can find the sum of the interior angles of a triangle and of a quadrilateral. • I can work out and use interior and exterior angles of polygons. • I can recognise direct and inverse variation. • I know what a constant of proportionality is and how to find it. • I can use an equation describing inverse or direct proportion. • I can give the nth term of a linear sequence.	• I can use angle and symmetry properties of polygons to solve problems. • I can use the interior and exterior angle properties of polygons to solve problems. • I can explain why some regular polygons tessellate and some do not. • I can solve more complex questions involving polygons. • I can work out compound interest. • I can solve simple problems involving direct or inverse proportion.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 9 Learning Sequence (Scheme of Work)

Ye Year 9: : Module 4/6 w.c. 28th February 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Ratio and Proportion • Scale drawings • Ratio notation • Equivalent ratios and fractions • Direct and inverse proportion • Real life graphs Geometry and Measure • Pythagoras' theorem • Trigonometry in right angled triangles (SOHCAHTOA) • Units of measure • Area, perimeter and volume, including compound shapes (including complex e.g. L shapes) • Problems involving area, perimeter and volume (including money problems)	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Ratio Direct proportion Unitary method Unit cost Best buy/ Better value Value for money Hypotenuse Diagonal Adjacent Square Square root 2-D / 3-D Adjacent Tangent Opposite Pythagoras' Theorem Sine Cosine Trigonometric Ratios Angle of Depression Angle of Elevation Prism Total surface area Curved surface area Composite shape Volume Prism Total surface area Curved surface area Semicircle π (pi), arc, chord, circumference, diameter,

National Curriculum

- Draw and measure line segments and angles in geometric figures, including interpreting scale drawings
- Extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically
- Express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1
- Use ratio notation, including reduction to simplest form
- Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio
- Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction
- Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions
- Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles
- Change freely between related standard units [for example time, length, area, volume/capacity, mass]
- Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)
- Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes

	radius, sector, segment, tangent

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life	KS2 National Curriculum, Year 7 and Year 8 curriculum	https://theday.co.uk/members-login/

Year 9Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 9: : Module 4/6 w.c. 28 February 2022		1	• To convert from one metric unit to another • To convert from one imperial unit to another		**Maths in real life**: Ratios are used in bicycle gears to enable riders to tackle steep slopes, such as the Alpine stages of the Tour de France. A smaller gear ratio between the cogs connected to the pedals and those on the back wheel makes it easier to pedal uphill, whereas a larger gear ratio allows for more control downhill.	• The basic units used for measuring length, mass and capacity • How to multiply or divide numbers by 10, 100 or 1000 • The names of common 3D shapes • How to measure lines accurately. • Multiplication tables up to 12 × 12 • How to simplify fractions	Formative in class Address misconceptions
		2	• To read and draw scale drawings				Formative in class Address misconceptions Targeted questioning Live marking
		3	• To use a scale drawing to make estimates				
		4	• To introduce ratio notation				Formative in class Visualiser comparison Live marking Address misconceptions
		5	• To use ratios to compare quantities				
		6	• To write a ratio as simply as possible				

		7	• To use ratios to find missing quantities			• How to find a fraction of a quantity • How to multiply and divide, with and without a calculator.	Targeted questioning
		8	• To understand the connection between ratios and fractions.				
		9	**RMP: Bridge the gap**			Phases 1-8	Formative in class Visualiser comparison Live marking
		10	• To understand the meaning of direct proportion		**Maths in real life**: The proportions of the parts of the human body change with age. For an average baby, the length of the head is about a quarter of the length of the whole body. For an average adult, it is about an eighth. Exact body ratios vary from person to person, and scientists have found that the 'ideal' body shape varies from one country and culture to another.	• Multiplication tables up to 12 × 12. • How to simplify fractions. • How to find a fraction of a quantity. • How to multiply and divide, with and without a calculator.	Formative in class Address misconceptions Targeted questioning Live marking
		11	• To find missing values in problems involving proportion				
		12	• To represent direct proportion graphically and algebraically				
		13	• To understand what is meant by inverse proportion				Formative in class Address misconceptions
		14	• To solve problems using inverse proportion				
		15	• To recognise direct and inverse proportion and work out missing values				
		16	• **Flexi lesson** – Mathematics reading for comprehension Literacy resource.				Focus TBC
		17	• To understand Pythagoras' theorem • To calculate the length of the hypotenuse in a right-angled triangle		**Maths in real life**: Pythagoras' theorem that has been used by builders for thousands	• How to square a number. • How to calculate the square root of a number.	Formative in class Address misconceptions
		18	• To calculate the length of a shorter side in a right-angled triangle				

					of years to check right angles in construction.		
		19	• To use Pythagoras' theorem to solve problems				
		20	• To use Pythagoras' theorem in isosceles triangles				
		21	• **RMP: Bridge the gap**			Phases 10-20	Targeted learning based on trends
	Number	22	• To use trigonometric ratios to calculate a length in a right-angled triangle		**Maths in real life**: With a tape measure, a calculator and a protractor, you can use trigonometry to work out the height of a tall tree or building.	• What a right-angled triangle is. • How to round numbers to a suitable degree of accuracy. • What a hypotenuse is • How to change a fraction into a decimal.	Formative in class Address misconceptions Targeted questioning Live marking
		23					
		24	• To use the trigonometric ratios to calculate an angle				
		25	**RMP: Bridge the gap**			Phases 21-23	Targeted learning based on trends
		26	• To measure and draw lines accurately • To work out the perimeter of any shape including compound shapes		**Maths in real life**: Volume tells us how much space there is inside a structure. In England, a regulation governs the number of people who can use an office based on the		
		27	• To use a simple formula to calculate the area of 2D shapes including compound shapes.				

		28	• To work out the volume of a cube or cuboid using a simple formula		volume of a room. Surface area enables us to calculate how many tins of paint are needed to paint a room.		
		29	**RMP: Bridge the gap/Application**			Phases to date	**Assessed piece** Deep mark

The Dean Trust
Lord Derby Academy

LDA Mathematics

Curriculum Passport Year 9

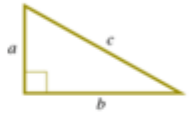
Module 4 Ratio and Proportion, Geometry and Measure

Powerful Vocabulary

- Direct proportion
- Unitary method
- Sin
- Cos
- Tan
- Hypotenuse
- Adjacent
- Opposite
- Pythagoras
- Trigonometry

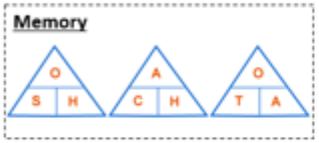
Knowledge Recall

Pythagoras' Theorem



$$a^2 + b^2 = c^2$$

Trigonometry



MathsWatch Clips

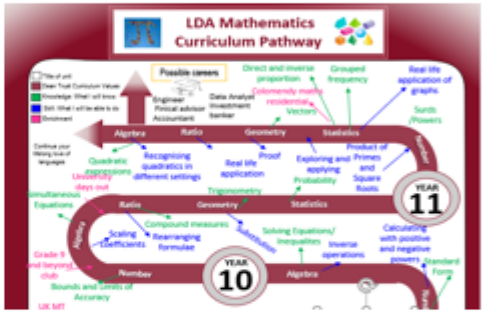
38, 41, 42, 106, 142, 150, 168 , R10, G35a b, 168

Links To Other Subjects

Science, Geography, Computing, Food technology, Art, PE, Design Technology, Geography

Probing Questions?

- Why is it important to understand similar triangles when using trigonometric relationships?
- Is it possible to have a triangle with the angles and lengths shown below?
- What is the minimum information you need about a triangle to be able to calculate all three sides and all three angles?
- When should you use tan, cosine or sine? What is the biggest difference here?



Foundation	Developing	Secure	Advanced
• I can simplify a ratio. • I can compare prices of products to find the 'best buy'. • I can solve direct proportion problems.	• I can use ratio to solve problems. • I can compare prices of products to find the 'best buy'. • I can solve direct proportion problems. • I can find square and cube numbers and square and cube roots.	• I can recognise direct and inverse variation. • I know what a constant of proportionality is, and how to find it • I can use an equation describing inverse or direct proportion. • I can use Pythagoras' theorem in 2D. • I can solve problems using Pythagoras' theorem.	• I can use the trigonometric ratios for sine, cosine and tangent in right-angled triangles. • I can solve problems using trigonometry. • I can solve problems using angles of elevation, angles of depression and bearings.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 9 Learning Sequence (Scheme of Work)

Year 9: : Module 5/6 w.c. 25th April 2022

Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
Algebra • Understand equivalence • Order of operations • Simplify and manipulate algebraic expressions Number • Place value • Rounding and estimation • Equivalence and ordering of fractions, decimals and percentages • Four operations (FDP) • Four operations (BIDMAS) Probability • Exhaustive probabilities • Single event probability • Diagrams to calculate probabilities • And /Or Rule	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	Equivalent Brackets Indices (Powers) Division Multiplication Addition Subtraction Simply Terms Collect like terms Algebraic expression Place value Standard form Round Estimate Positive/Negative powers Fraction, Decimals, Percentages Numerator Denominator Probability Exhaustive Mutually exclusive Tree diagram Space sample diagrams Systematic

National Curriculum

- Simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms, multiplying a single term over a bracket, taking out common factors, expanding products of two or more binomials
- Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- Understand and use place value for decimals, measures and integers of any size
- Interpret and compare numbers in standard form A x 10n 1≤A
- Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]
- Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation a<x≤b
- Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, , ≤, ≥
- Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative

• Interpret fractions and percentages as operators • Understand that the probabilities of all possible outcomes sum to • Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities	

Enrichment	Cultural Capital/SMSC	Careers	Builds on … *(Pre-requisite knowledge)*	Reading *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life	KS2 National Curriculum, Year 7 and Year 8 curriculum	https://theday.co.uk/members-login/

Year 9 Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 9: : Module 5/6 w.c. 25th April 2022	**If we didn't use algebra, how would we write instructions that had missing numbers?**	1	• To simplify algebraic expressions involving the four basic operations		**Maths in real life**: Spreadsheets have widespread applications in business and industry. Calculations can be written in symbolic form in the spreadsheet – algebra. In areas of science such as computer programming, algebra helps us write things simply and clearly.	What an algebraic expression is How to interpret simple algebraic expressions How to write simple algebraic expressions Understand BIDMAS	Formative in class Address misconceptions Oracy skills- think pair share
		2					Formative in class Address misconceptions Targeted questioning Live marking
		3	• To simplify algebraic expression by combining like terms				
		4	• To remove brackets from an expression. Single and double and simplify				Formative in class Visualiser comparison Live marking
		5					

		6	• To use algebraic expressions in different contexts				Address misconceptions Targeted questioning Oracy skills- think pair share
		7	• Apply BIDMAS in algebraic questions				
		8	**RMP: Bridge the gap**			Phases 1-7	
	Why do news reporters use standard form to report on how many people attended a football match?	9	• To understand and work with standard form, using both positive and negative powers of ten		**Maths in real life**: Using standard form to write very large or very small numbers reduces the chances of transcription errors in calculations: being out by a factor of 10 when doing a calculation about space travel would be disastrous!	To multiply and divide by powers of 10	Formative in class Visualiser comparison Live marking Oracy skills- think pair share
		10	• To write a number in standard form				Formative in class Address misconceptions Targeted questioning Live marking
		11	• To calculate with numbers in standard form				
		12	• To round to 1 significant figure and estimate answers			Rounding rules Understand significant figures How do divide fractions by decimals	
		13					Formative in class Address misconceptions Oracy skills- think pair share
	What would happen if we got rid of fractions?	14	• To find equivalent fractions before putting them in order		**Maths in real life**: Fractions and decimals are different ways of writing the same concept, but in some instances, one is easier to use than the other.	Times tables 12x12	
		15	• To make links between fractions, decimals and percentages			Percentage is out of 100 Able to multiply and divide by 100	
		16					

		17	• To find reciprocals of numbers or fractions		For example, you use decimals to write an amount of money, but fractions to talk about parts of an hour.	Fractions that equal 1 What it means to multiply by 1	Formative in class Address misconceptions Oracy skills- think pair share
		18	• To convert terminating decimals to fractions				
		19	• To add or subtract any two fractions			Times tables 12x12 Converting mixed numbers into improper fractions	
		20	• To multiply two fractions • To multiply one mixed number by another • To work out a fraction of a quantity				
		21	• To divide one fraction or mixed number by another				
		22	• To use a calculator to add and subtract, multiply and divide fractions				
	What would happen if scientists didn't use BIDMAS ?	23	• To use the conventions of BIDMAS to carry out calculations		**Maths in real life**: The order of operations is a set of rules for calculating sued worldwide. It is used is programming computers and calculators.	Mental calculation methods	
		24	**RMP: Bridge the gap**			Phases 9-23	
		25	• **Flexi lesson** – Mathematics reading for comprehension Literacy resource.				Focus TBC

	What is the advantage of using probabilities to predict an outcome? **Why do manufacturers use probability to work out sales of their products?**	**26**	• To recognise mutually exclusive and exhaustive outcomes		**Maths in real life**: Probability is used in weather forecasting to combine the chances of different indicators of rain to come up with an overall probability.	Multiply decimals and fractions Add fractions with the same denominators Use a systematic approach to listing outcomes	Formative in class Address misconceptions Oracy skills- think pair share
		27	• To predict the likely number of successful outcomes, given the number of trials and the probability of any one outcome.				
		28	• To understand frequency tree diagrams and probability tree diagrams				
		29	• To work out the probabilities when two or more events occur at the same time				
		30	• To understand the AND/OR rules				
		31	• To apply systematic listing and counting strategies to identify all outcomes for a variety of problems				
		32	• **RMP: Bridge the gap**			Phases 26-30	Targeted learning based on trends
		33	**RMP: Bridge the gap/Application**			Phases to date	**Assessed piece** Deep mark

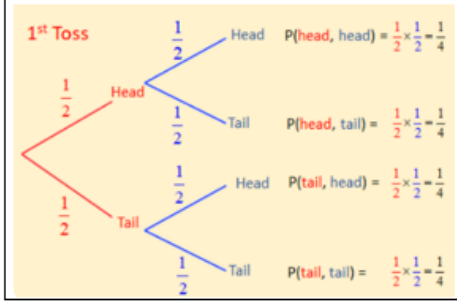
THE DEAN TRUST
Lord Derby Academy

LDA Mathematics
Curriculum Passport Year 9
Module 5 Algebra, Number and Probability

Powerful Vocabulary

- Evaluate
- Expressions
- Factorise
- Expand
- Significant Figure
- Bounds
- Probability
- Outcomes
- Experimental
- Theoretical

Knowledge Recall

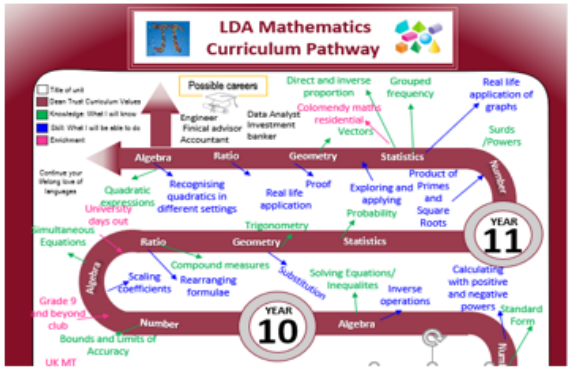


$P(\text{not } A) = 1 - P(A)$.

$P(A \text{ or } B) = P(A) + P(B)$.

Probing Questions?

- What is the difference between a frequency tree and a probability tree?
- If the probability of rolling a square number on a dice is one-third, how many times would you expect a square number if you rolled the dice 60 times?
- If you rolled a fair dice and flipped a fair coin, what would be the probability of rolling an even number and flipping a head?



MathsWatch Clips

A6, A7, N27, N17, N43, N45 N38, G29, 131, 134, 93, 188, 29, 157, 206, 14, 63, 58, 59, 60, 57, 61, 125, 151

Links To Other Subjects

Science, Statistics, Geography, Design and Technology

Foundation	Developing	Secure	Advanced
• I can simplify algebraic expressions by collecting like terms. • I can round numbers to the nearest 10, 100 or 1000. • I can use the probability scale and understand the language of probability. • I can use fractions, decimals or percentages to work out a probability of an outcome.	• I can simplify algebraic expressions by collecting like terms. • I can write algebraic expressions in a simpler form using index notation. • I can round numbers in order to make sensible estimations. • I can read two-way tables and use them to work out probabilities. • I can use frequency tree diagrams to solve problems.	• I can simplify algebraic expressions with several terms by combining like terms. • I can round numbers to one significant figure in order to make sensible estimations. • I can calculate probabilities when two events happen at the same time. • I can use Venn diagrams to work out probabilities.	• I can manipulate algebraic expressions, including those involving fractions, and write them in different forms. • I can write and rearrange algebraic expressions involving cubes and other powers. • I can draw and use probability tree diagrams to work out probabilities. • I can recognise mutually exclusive and exhaustive outcomes. • I can understand set notation.

What are we learning? → Why are we learning it? → What is the key skill/knowledge? → How does it link to previous/future study?

Year 9 Learning Sequence (Scheme of Work)

Year 9: : Module 6/6 w.c. 6th June 2022	Key Knowledge *What will pupils know?*	Key Skills *What will pupils be able to do?*	Powerful Vocabulary *Essential for all*
	Data • Compare data sets • Averages Geometry and Measure • Single and combined transformations • Translation using 2D vectors • Use column representation of vectors • Similar Shapes (lengths, area and volume)) • Ruler and Compass constructions	• Use a calculator and ICT • Apply maths in real life context and solve problems • Understand Mathematical language • Identify misconceptions • Display fluency • Reason mathematically including written communication skills	• Class interval • Data collection sheet • Experiment • Frequency • Frequency table • Grouped frequency table • Observation • Sample • tally chart • Bar chart • Composite bar chart • Dual bar chart • Key • Pictogram • Vertical line chart • Line graph • Time series graph • Trend • Average • Categorical • Consistency • Modal • Outlier • Range • Representative • Spread • Stem-and-leaf diagram

National Curriculum

- Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)
- Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures
- Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grid

	• Order of rotational symmetry • Rotational symmetry • Image • Object • Transformation • Translation • Vector • Mirror line • Reflection • Angle of rotation • Centre of rotation • Rotation • Centre of enlargement • Enlargement • Direction • Magnitude • Resultant vector • Scalar • Angle bisector • Perpendicular bisector • Equidistant • Loci (locus)

Enrichment	**Cultural Capital/SMSC**	**Careers**	**Builds on …** *(Pre-requisite knowledge)*	**Reading** *(Age)*
KS3 Mathswatch Club Engineers for the future Higher Achievers Club	Financial Banking Workshops	Careers display board Links to Real Life	KS2 National Curriculum, Year 7 and Year 8 curriculum	https://theday.co.uk/members-login/

Year 9Learning Sequence (Scheme of Work)

	Component title	Lesson no.	Phase objectives	CC / DT Values	Real Life Links	Revisit	Assessment Marking
Year 9: : Module 6/6 w.c. 6th June 2022	Which is the best average to use? Why?	1	• To use the median and range to compare data		**Maths in real life**: Comparing sets of real world data can show relationships between two events, such as sales of sunscreen and ice-cream, and hot weather. It can also investigate cases where the two pieces of data may or may not be related, such as height and handspan.	Working out Mean, Median, Mode and Range Mental calculations Written calculations Comprehension of key vocabulary How to use a tally for recording data How to read information from charts and tables	Formative in class Address misconceptions Oracy skills- think pair share
		2	• To make sensible decisions by comparing the median and range of two sets of data				Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		3	• To understand when each different type of average is most useful. Apply knowledge to average questions (Mean, Median, Mode and Range)				
		4					
		5					
		8	**RMP: Bridge the gap**			Phases 1-5	
	What are transformations? What are they for?	9	• To work out the order of rotational symmetry for a 2D shape		**Maths in real life**: Maths in real life: Decorative patterns on clothes, curtains, furniture fabric, carpets and wallpaper usually make use of symmetry to produce a repeated pattern, where a base unit can be copied forever. There are just 17 different types of	How to find the lines of symmetry of a 2D shape How to draw lines with the equations $x = \pm a$, $y = \pm b$, $y = x$ and $y = -x$ How to measure lines and angles.	Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		10	• To recognise shapes with rotational symmetry				
		11	• To translate a 2D shape				
		12	• To reflect a 2D shape in a mirror line				
		13	• To rotate a 2D shape about a point				

		14	• To enlarge a 2D shape by a scale factor		repeating design, depending on the symmetry used.		
		15	• To use more than one transformation				
		16	• To represent vectors				
		17	• To add and subtract vectors				
		18	**RMP: Bridge the gap**			Phases 1-5	Formative in class
	What skills do people use when planning the design of their garden?	19	• To construct accurate drawings of triangles, using a pair of compasses, a protractor and a straight edge		**Maths in real life**: Loci have a range of practical applications including helping to decide on suitable routes for a new train line.	How to measure lines and angles How to use scale drawings.	Formative in class Address misconceptions Targeted questioning Live marking Oracy skills- think pair share
		20	• Construct the bisectors of lines and angles				
		21	• To be able to construct angles of 60° and 90°				
		22	• To be able to draw a locus for a given rule				
		23	**RMP: Bridge the gap**			Phases 9-23	
		24	• **Flexi lesson** – Mathematics reading for comprehension Literacy resource.				Focus TBC
		25	**APPLICATION** – End of year assessment. Whole year revision and intervention of				**Assessed piece** Deep mark, question level analysis

		26	weak topics. Getting ready for end of year assessments.				
		27					
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Homework

Pupils are set homework on a weekly basis by individual class teachers on https://vle.mathswatch.co.uk/vle/ . At times pupils are set an additional homework on paper.

Enrichment

Enrichment is offered in Mathematics through a variety of pathways. For example:

- KS3 Kahoot competitions
- LDA Young Engineers of The Future
- Weekly newsletter Numeracy puzzles
- Financial Skills workshops
- Problem Solving Sessions BMAM
- Maths Enrichment Mystery Challenge
- Pi Day
- National Numeracy Day
- International Day of Maths
- KS3 Twitter Challenges

Research and Useful Websites and Subscriptions

Mathematic Specific Pedagogy and Resources

- **Mathswatch** https://vle.mathswatch.co.uk/vle/
- **Collins Connect** https://connect.collins.co.uk/
- **Corbett Maths** https://corbettmaths.com/
- **Maths Genie** https://www.mathsgenie.co.uk/gcse.html
- **MathsBox** https://www.mathsbox.org.uk/index1.php
- **Twinkl** https://www.twinkl.co.uk/sign-in
  Go teach maths **https://www.goteachmaths.co.uk/**
- **Mathspad** https://www.mathspad.co.uk/resendDetails2.php
- **NCETM** https://www.ncetm.org.uk/
- **White Rose Maths** https://whiterosemaths.com/resources?year=year-7
- **NRICH** https://nrich.maths.org/secondary
- **National Curriculum** https://www.gov.uk/government/publications/national-curriculum-in-england-secondary-curriculum
- **OFSTED MATHS CURRICULUM UPDATE VIDEO** https://www.youtube.com/watch?v=QK9vAAIWiCM
- **National curriculum KS2, KS3, KS4, KS5**

Teaching and Learning Pedagogy

Useful links to help with Teaching and Learning Pedagogy, with a particular focus on classroom and behaviour management.

- **Classcharts** https://www.classcharts.com/
- Classroom Management Strategies to Take Control of Noisy Students
- https://www.youtube.com/watch?v=u086rr7SRso
- Classroom Management Strategies to Take Control of Noisy Students Video 2
- https://www.youtube.com/watch?v=I9Jk74XO98M
- Bill Rogers - Cracking the Challenging Class (Programme 1)
- https://www.youtube.com/watch?v=rF_BdBEUv_4
- Bill Rogers - Cracking the Challenging Class (Programme 2)
- https://www.youtube.com/watch?v=WKfZgm4k_jE
- Bill Rogers on behaviour
- https://www.youtube.com/watch?v=KTxGXiuLgb4
- 10 of the Best Behaviour Management Ideas for Secondary School Teachers
- https://www.teachwire.net/news/behaviour-management-ideas-for-secondary-school-teachers
- Education Endowment Foundation (EEF) https://educationendowmentfoundation.org.uk/

Numeracy

Reading

Health in Mind, Body & Soul

Enrichment

Careers

Powerful Knowledge

Ambition & Aspiration

Global Citizenship

Cultural Capital