

Maths Curriculum Overview, 2021-2022

Why do we teach Maths at Ark BDA?

Intent

The Maths curriculum is designed to ensure that all students make good progress and achieve in Mathematics; to become numerate, analytical thinkers and problem solvers. We prepare them for both the outside world and build the foundations for accessing their next level of education and training. The curriculum is structured in such a way that concepts are divided into small steps; essential skills are practiced until they are fluent; then used in problem-solving applications. We believe that all students can achieve at the highest level with perseverance and practice. We are ambitious for our students; we discourage students, parents and teachers from describing anyone as a 'Maths' or 'Not a Maths' person to encourage a growth mindset and 'can do' attitude which builds confidence.

In the primary school, we follow Mathematics Mastery, a programme developed by Ark Schools. The focus is always on a progression from concrete resources to pictorial representation and into the numerical abstract, which supports the development of deep conceptual understanding. Each lesson, our pupils work on practising core skills, applying them to real-life contexts and developing the essential skills of reasoning and problem solving. Teaching for mastery does not mean we do not differentiate, but we do aim high for all.

Our curriculum is designed to give learners the opportunities to think mathematically. Throughout the curriculum there are interleaved tasks that require learners to specialise and generalise, to work systematically, to generate their own examples, to classify and to make conjectures. This is aided by our prompts for thinking which help make these principal parts of mathematics more explicit.

Lessons have a common structure across the department. Our curriculum is designed to ensure there is regular practice and feedback, through classwork, homework tasks on Hegarty Maths, mini-tests, weekly skills tests and formative and summative assessments.

In our curriculum, extended time is spent within a single area of mathematics. This allows teachers to spend more time developing learners' conceptual understanding. It also provides opportunities to go into greater depth within a concept area and make connections with other areas of mathematics.

The curriculum is organised to be cumulative. This means that mathematical concepts that are taught earlier in the curriculum are revisited in the context of a new area of mathematics. This supports learners to make connections between different mathematical concepts. Retrieving, using and applying concepts regularly, transferring to new contexts enables fluency as well as conceptual understanding.

We provide a single curriculum map that all learners are expected to follow. This means that all learners have the same access to the curriculum content and there is no ceiling imposed on what learners can achieve throughout their mathematical journey through the key stages.

The KS1 and KS2 departments focus on 3 key areas of mathematics:

Conceptual Understanding
Language and Communication
Mathematical Thinking

The KS3 and KS4 the curricula have 5 strands:

Number (N)
Algebra (A)
Ratio, Proportion and Rates of Change (R)
Geometry and Measures (G)
Statistics (S)
Probability (P)

Each term pupils will meet objectives from at least 2 units of the 5 strands of the Mathematics Curriculum. The implementation is under constant review, especially after the pandemic disruption; this is to accommodate for the gaps in prior learning for current Y9, Y10 and 11 students. Throughout Y10 and Y11 each half-term time is allocated for pupils to focus on revision of topics covered earlier in the year. In year 11, all groups do not cover every element of the curriculum map – there is an emphasis on depth before breadth; teachers adjust the trajectory through the curriculum map dependent on students' attainment and progress.

	<p>At Ark BDA, we teach three key elements of Mathematics:</p> <p>We teach the necessary Maths to help grow student confidence with real-life numeracy; practical maths related knowledge and work- related knowledge. We also aim to furnish students with the subject knowledge required to access higher qualifications in mathematics, science, economics and various other courses beyond KS4, and KS5. Fluency in fundamental Maths is essential to their learning journey. It enables students to apply knowledge rapidly and accurately.</p> <p>We teach the personal and social aspects of maths that enables students to model problems in a mathematical framework and problem solve. We believe Mathematics makes our lives orderly and prevents chaos. Certain qualities are nurtured by maths such as analysing, evaluating, generalising, creativity, abstract or spatial thinking, effective communication, reasoning and justifying with mathematical language that students need to be successful later in life. To access problem solving skills conceptual understanding is essential to allow students to make links and connections. The deeper the mathematical understanding, the more our students persevere to find solutions to problems.</p> <p>Finally, we teach an appreciation of Maths, not just as a subject, but as an ‘Element of Culture’ that has played a major part in history, culture and the evolution of society over time.</p>
<p>How do we deliver our Christian values in Maths?</p>	<p>With reference to the school’s Christian vision, our maths lessons are delivered based on the four pillars:</p> <ul style="list-style-type: none"> • Be kind • Be Brave • Aim high • Keep learning <p>This is supported by the core values of Love, Compassion, Commitment, Faith, leadership Resilience and Courage. Our lesson structure facilitates the practice of these core values.</p> <p>From Key Stage 1 right through to Key stage 3, students are exposed to opportunities where they develop their mathematical thinking. In these lessons' students investigate topics, collate their findings and present their ideas to their peers.</p> <p>We do not believe in having different lesson objectives for our pupils just because they may have a lower starting point. We have one highly pitched lesson objective for each lesson because we have high expectations for every pupil. We are ambitious and set a challenging curriculum to ensure high standards are met for every child.</p> <p>The entire maths team are involved in ensuring year 11 achieve excellent outcomes by running school intervention, creating resources, running homework clubs or running booster sessions. Because of this, students have faith that the maths teachers will do whatever is necessary to ensure pupils achieve their god given potential.</p>
<p>How do we build core skills and knowledge over time?</p>	<p>Key Stage1 and 2 We use Maths Mastery from Year R through to Year 6 which develops a deeper understanding and appreciation of the connections in mathematics, giving students the skills to adapt their knowledge to different situations. These transferable skills give our students the capacity to solve problems not only within the mathematics curriculum, but in the wider-world.</p> <p>Key Stage 3 During Key Stage 3 our mathematics curriculum is a mastery approach so that students can make progress by building on their prior attainment. The subject content of our KS3 curriculum covers the key areas of number, algebra, ratio, proportion and rates of change, geometry and measures, probability and statistics. Our students will:</p> <ul style="list-style-type: none"> • Become increasingly fluent in the fundamentals of mathematics working with increasingly complex problems so that conceptual understanding deepens alongside the ability to recall and apply knowledge accurately; • Reason mathematically by following a line of enquiry, exploring relationships and developing an argument or justification using mathematical language. • Solve problems by applying their mathematics with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

	<p>Starting points and decisions about progression are based on the security of students' understanding and their readiness to progress. Those not sufficiently fluent are supported to practice and consolidate their understanding before moving onto more complex problems.</p> <p>Key Stage 4 A tiered mathematics curriculum is in place so that students can make progress in Key Stage 4; key topics are nested within each tier to allow students to move between them according to their progress. Students will consolidate their numerical, algebraic, geometrical, statistical and mathematical capability from key stage 3. This includes:</p> <ul style="list-style-type: none"> • Extending their understanding of the number system and using increasingly complex calculation strategies. • Extending and formalising their knowledge of ratio and proportion, in working with proportional relations algebraically and graphically. • Reasoning deductively in geometry, number and algebra, including using geometrical constructions. • Making and using connections between different parts of mathematics to solve problems whilst using mathematical language, presentation and properties effectively, and with increasing precision. <p>We stream pupils from year 9 to support teachers to make the curriculum accessible to all (i.e. all pupils learn the same content with similar experiences, with differentiation amongst sets in the amount of support and planned revisiting). We use the data from assessments to inform continuous movement between higher groups and foundation groups both in year 9 through to year 10. Final decisions about tiering are not made until the start of Year 11</p> <p>Key Stage 5 In Key Stage 5 students are prepared for the Edexcel A-level Mathematics. Our Key stage 5 mathematics curriculum builds on the skills, knowledge and understanding from Higher tier GCSE. Students will demonstrate the following overarching knowledge and skills of mathematical argument, language and proof, mathematical problem solving and mathematical modelling. These will be applied, along with associated mathematical thinking and understanding, across the content that follows: proof; algebra and functions; coordinate geometry in the (x,y) plane; sequences and series; trigonometry; exponentials and logarithms; differentiation; integration; numerical methods; vectors; statistical sampling; data presentation and interpretation; statistical distributions; statistical hypothesis testing; quantities and units in mechanics; kinematics; forces and Newton's laws; moments.</p>
<p>How does the study of Maths prepare students for life beyond Ark BDA?</p>	<p>Students will drill new skills in lessons and at home to ensure they are engrained. Maths is useful in everyday life and essential for our young people to develop problem solving skills, logical thinking, spatial awareness, understanding currency, managing and evaluating data in order to make decisions and manage their own incomes and household finances in adulthood. Students gain confidence and enjoyment in the subject. Problem-solving, linking different areas and mathematics allows students to deepen their understand and progress through the increasingly difficult Mathematics. Links to Mr Hegarty clips are included in lessons and PLC documents at the front of their book, so they have ready access to reminders of 'how to' do all skills. Students at KS3 and KS4 follow a rigorous independent programme using Hegarty maths, tailored to their success with the work they cover. Student exercise books are a record of key examples plus errors, misconceptions, tips and checks that they can use to support revision and further practice. New skills are assessed through classroom 'mini- test' and formal extended assessments as per the school assessment calendar, include assessment on all topics covered so far in that key stage. Pupil reflection and teacher analysis inform independent learning for individuals and topics to be re-visited in review periods for classes.</p> <p>Students who go on to study maths and further maths at A level have a clear pathway into careers such engineering, finance, medicine, accountancy and trading as well as numerous other professions.</p> <p>Maths is necessary in all aspects of daily life. To be an independent, self-sufficient person, one would need maths for a massive range of situations, here are just some examples:</p> <p>The kitchen Baking and cooking: measuring ingredients, portioning recipes using ratio, multiplication and division to scale recipes.</p> <p>Gardening Calculating areas of land needed, seed/space ratio, working with volume regarding to amount of water needed.</p> <p>Art Whether you are a sculptor, a painter or a dancer. You will need to be able to measure, count, and apply basic maths for measurements.</p>

	<p>Planning/Organisation Planning outings requires a deep knowledge of time, map reading, calculating the cost of fuel required.</p> <p>Banking Managing finances requires a deep understanding of functional maths, knowledge of overdrafts, net profits, tax will to ensure financial success.</p> <p>Decorating your home Calculating amount of paint needed, measuring the floor for carpet or costing for new furniture.</p> <p>The careers accessible with a maths A level and maths degree are limitless but include:</p> <ul style="list-style-type: none"> • Accountant • Actuary • Aeronautical engineering • An academic mathematician • Defence and Intelligence roles • Operational researcher • Investment Banking • Investment management • Retail Banking • Statistician • Actuarial Analyst • Data analyst • Research Scientist • Engineering • Meteorology • Teaching
<p>Implementation (During the Pandemic)</p>	<p>As a response to Covid, the Maths department has been working together to create an abridged curriculum which has been further broken-down week by week, so teachers have a clear structure to ensure any gaps in learning are addressed. In year 7, 8 and 9 there are 4 lessons of maths each week. In year 10 and 11 there are 5 lessons of maths each week. Where there is spare capacity in the timetable, some year 11 students and some year 10 students have been lucky enough to receive an extra 2 periods of maths a week, dependant on their option blocks to support them further where it is required.</p> <p>Finally, in year 12 and 13 there are 6 face to face lessons of maths per week. When students have free periods, they are required to study independently in the 6th form library. This style of timetable mirrors university and is therefore developing the independent study skills needed for students to be successful at university.</p> <p>For KS3 and KS4 <u>fundamental</u> mathematical topics are taught each year. This is structured in a thematic way for each unit. This allows for pupils to cover fewer topics but gain a deeper level of understanding to emphasize maths mastery. The time taken to deliver each of these topics is divided equally between them. This gives teachers more scope to delve deeper into each topic. At the start of each of these units, Year 7 and 8 think about the big picture and how each topic they will learn about are linked. At the start of each unit, the maths team share the core learning that will take place with the pupils. We take this approach because research suggests teaching maths in this way positively impacts pupil progress in secondary school by on average 1 month.</p> <p>For year 9, 10 and 11 the time it takes to teach each topic varies. When determining the length of time that is allocated to each topic, two things are considered. The complexity of the topic, and the ability of the class. More complex topics such as transforming graphs, have more time allocated to teach them as they are harder for students to grasp. In addition, more time would be allocated to a less able class as opposed to a more able class. Time is then built in at the end of each half term, and again at the year to revisit</p>

	<p>topics taught. At the start of each key stage 4 topic, students explore how the topic ties into one of the ‘3 reasons why we study maths here at BDA’, mentioned above. All the topics that are taught from Early Years right through to Key Stage 5 reflect the most current Maths National Curriculum. These are woven together in a scheme of work that is chronological meaning within each unit, each topic that is taught builds on from the previous topic. The sequencing of the scheme of work allows pupils to revisit topics and build on key prior knowledge so that in practice students are moving back and forth throughout the key skills to both build on new learning and revisit prior learning to secure the domain of knowledge. Deep thought has been put into the sequence of units which have been interleaved to ensure that pupils can not only access the learning but that they can make connections across topics. At the start of each year, our secondary students are given checklists which detail all the topics that they will cover that year. Lesson by lesson teachers share the core learning for that lesson along with any academic vocabulary, and at the end of each lesson students are encouraged to revisit the core knowledge checklist and self-assess their confidence levels. This list is sent home to parents at the start of the year, along with a guide detailing how their student should be studying independently at home. Pupils are also given comprehension booklets that have a model example and the guided practice questions covered in each lesson. These booklets are used alongside lesson power points so that students do not miss out on curriculum delivery in the event of a full lockdown. At KS4 we use comprehension booklets to ensure that students can recall the key skills for each unit and can apply them. Students are expected to complete a minimum of 1.5hrs homework on an online platform called Hegarty Maths. In addition to this, students at Key Stage 4 are given GCSE revision books, a compilation of low stakes quizzes, and revision guides to encourage them to revisit prior knowledge throughout the year.</p> <p>There are 3 strands in maths that underpin the entire curriculum from Early Years to Key Stage 5. Fluency - are pupils confident in performing the mathematical skills over and over; Reasoning – can pupils explain and justify what they have done; and Problem solving – can pupils do both in context.</p>
<p>Impact</p>	<p>Pupils from Early Years to Key stage 5 are assessed in a variety of ways. In Early Years, assessment consists of teacher assessment against the early learning goals. Once in Key Stage 1, assessment builds up to daily formative assessment where teachers give live feedback and then there are more formal summative assessments in the form of the PUMA and PIRA papers. This continues in Key Stage 2. Notable national assessments are the Year 2 SATs, the Multiplication Table Check at the end of Year 4 and the Year 6 SATs. Further to these assessments, Maths Mastery and ARK will introduce diagnostic quizzes to efficiently find gaps in knowledge prior to new topics, so teachers can respond accordingly to their children’s needs.</p> <p>Secondary pupils' self or peer mark their work at the end of every lesson. Within the class we assess formatively to give students immediate feedback, as with primary, so that pupils can improve, something we call fast feedback. Based on research this is the most effective form of immediate feedback that allows students to make the most progress but has the least impact on teacher workload. In addition to this, we use summative assessments at the end of every term. This is to ensure that students are building on their knowledge each term. Finally, we do one final assessment at the end of the year. For year 7 this includes the topics they have learned that year. For year 8 it includes the topics learned in year 7 and 8, and so on.</p> <p>That said, the curriculum at BDA is driven by our curriculum intent as opposed to assessment models. We will know if students at BDA have met our curriculum intention if:</p> <ul style="list-style-type: none"> • they are confident and fluent with numeracy • they can apply their mathematical skills in other subjects • they choose to access STEM based courses in higher education • they have acquired the key transferable skills such as analysing, evaluating, generalising, reasoning and justifying • they can make links and connections • they are resilient when faced with a problem • they appreciate maths as not just a subject but as a part of culture

Year Group	Key curriculum end point: Knowledge and skills	How does it link to future progression?
R		
1	<p>By the end of the year, students will have knoweldge of:</p> <p><u>Addition and subtraction</u></p> <ul style="list-style-type: none"> • Explore addition and subtraction involving 2-digit numbers and ones • Represent and explain addition and subtraction with regrouping • Investigate numbers within 20 • Commutativity • Represent and explain addition and subtraction <p><u>Shape and patterns</u></p> <ul style="list-style-type: none"> • Identify, describe, sort and classify 2-D and 3-D shapes • Investigate repeating patterns • Use and follow instructional and positional language <p><u>Time</u></p> <ul style="list-style-type: none"> • Read, write and tell the time to o'clock and half past on analogue clock • Sequencing daily activities • Whole and half turns linked to time <p><u>Fractions</u></p> <ul style="list-style-type: none"> • Identify $\frac{1}{2}$ and $\frac{1}{4}$ of a shape or object • Find $\frac{1}{2}$ or $\frac{1}{4}$ of a quantity <p><u>Measures: Length and mass</u></p> <ul style="list-style-type: none"> • Compare and measure lengths and mass using cm and kg • Doubling and halving <p><u>Numbers: 50 ot 100 and beyond</u></p> <ul style="list-style-type: none"> • Read, write, represent, compare and order numbers to 100 • Identify number patterns • Doubling and halving <p><u>Money</u></p> <ul style="list-style-type: none"> • Represent the same value using different coins • Find change • Name coins and notes and understand their value <p><u>Multiplication and division</u></p> <ul style="list-style-type: none"> • Share equally into groups • Doubling • Link halving to fractions • Add equal groups • Explore arrays <p><u>Measures: Capacity and volume</u></p> <ul style="list-style-type: none"> • Compare capacities, volumes and lengths • Explore litres • Apply understanding of fractions to capacity 	<p><u>Number Sense:</u></p> <p>Year 2: Numbers within 100 Year 2: Numbers within 1000 Year 3: Number sense and exploring strategies Year 3: Place Value Year 4: Reasoning with large numbers Year 4: Decimals Year 4: Reasoning with patters and sequences Year 5: Reasoning with large whole intergers Year 5: Fractions and decimals Year 5: Problem solving Year 6: Integers and decimals Year 6: Calculation problems Year 6: Decimals and measure Year 6: Percentage and statistics Year 6: Proportion problems</p> <p><u>Addition and Subtraction</u></p> <p>Year 2: Addition & Subtraction within 10 Year 2: Addition & Subtraction word problems Year 2: Addition & Subtraction of 2 digit numbers Year 2: Exploring calculation strategies Year 3: Addition and subtraction Year 3: Exploring calculation strategies and place value Year 4: Addition & Subtraction Year 5: Integer addition and subtraction Year 5: Calculating with whole numbers and decimals</p> <p><u>Multiplication & Division</u></p> <p>Year 2: Multiplication & Division 2,5,10 Year 2: Multiplication and division: 3 and 4 Year 3: Multiplication and Division Year 3: Deriving Multiplication and division facts Year 3: Securing multiplication and division Year 4: Multiplication and Division Year 4: Securing multiplication facts Year 5: Multiplication and divisions Year 6: Multiplication and division</p> <p><u>Shape:</u></p> <p>Year 2: Face, shape & Patterns: Lines and Turns Year 3: Angles and Shape Year 4: Area and perimeter Year 4: Shape and symmetry Year 4: Position and direction Year 4: 3-D Shape</p>

		<p>Year 5: Perimeter and area Year 5: Angles Year 5: Transformations Year 5: 2-D and 3-D shape Year 6: Missing angles and length Year 6: Coordinates and shape</p> <p><u>Statistics:</u> Year 2: Graphs Year 3: Graphs Year 4: Discrete and continuous data Year 5: Line graphs and timetables</p> <p><u>Measures:</u> Year 2: Length Year 2: Time Year 2: Capacity and Volume Year 2: Mass Year 3: Length and Perimeter Year 3: Time Year 3: Measures Year 4: Time Year 5: Converting units of measure Year 5: Volume</p> <p><u>Fractions:</u> Year 2: Fractions Year 3: Fractions Year 4: Fractions Year 5: Fractions and decimals Year 5: Fractions and percentages Year 6: Fractions</p> <p><u>Money:</u> Year 2: Money Year 4: Solving measures and money problems</p>
2	<p>By the end of the year, students will have knowledge of:</p> <p><u>Number:</u></p> <ul style="list-style-type: none"> • Represent in different ways • Compare using symbols • Read scales <p><u>Addition and subtraction:</u></p> <ul style="list-style-type: none"> • Apply number bonds to add and subtract • Represent and explain addition and subtraction of two 2-digit numbers. • Add three 1-digit numbers • Illustrate, represent and explain addition and subtraction involving regrouping including 'Make Ten', 'Round and adjust' and near doubles strategies • Introduction to bar models as a representation • Create, label and sketch bar models <p><u>Measures: Length</u></p>	<p><u>Number Sense:</u> Year 3: Number sense and exploring strategies Year 3: Place Value Year 4: Reasoning with large numbers Year 4: Decimals Year 4: Reasoning with patterns and sequences Year 5: Reasoning with large whole integers Year 5: Fractions and decimals Year 5: Problem solving Year 6: Integers and decimals Year 6: Calculation problems Year 6: Decimals and measure Year 6: Percentage and statistics Year 6: Proportion problems</p>

- Draw and measure lengths in centimetres
- Use and = to compare and order lengths in metres and centimetres

Graphs:

- Represent and interpret: pictograms, block diagrams, tables and tally charts

Multiplication and division:

- Calculate the times tables of 2, 3, 4 5, and 10
- Relate the 2 times table to doubling
- Explore representations of multiplication and division
- Commutativity
- Inverse

Time:

- Tell the time on an analogue clock: quarter past, quarter to and five minute intervals
- Calculate durations of time in minutes and seconds
- Sequence daily events
- Minutes in an hour and hours in a day

Fraction:

- Part-whole relationships
- Fractions as part of a whole or a whole set
- Relate to division
- Equivalent fractions

Money:

- Recognise coins and notes
- Use £ and p accurately
- Add and subtract amounts
- Calculate change

Shape:

- Explore, sort and describe 2-D shapes
- Lines of symmetry in 2-D shapes
- Identify 2-D shapes on 3-D shapes
- Compare and sort 2-D and 3-D shapes
- Use language to describe position, direction and rotation to follow a route

Measures: Capacity and volume

- Read and measure temperature
- Estimate, measure and understand litres and millilitres
- Compare and order capacities

Measures: Mass

- Weigh and compare masses in kilograms and grams

Exploring Calculation Strategy:

- Apply addition and subtraction strategies to solve equations
- Illustrate and explain addition and subtraction using column method

Addition and Subtraction

Year 3: Addition and subtraction
 Year 3: Exploring calculation strategies and place value
 Year 4: Addition & Subtraction
 Year 5: Integer addition and subtraction
 Year 5: Calculating with whole numbers and decimals

Multiplication & Division

Year 3: Multiplication and Division
 Year 3: Deriving Multiplication and division facts
 Year 3: Securing multiplication and division
 Year 4: Multiplication and Division
 Year 4: Securing multiplication facts
 Year 5: Multiplication and divisions
 Year 6: Multiplication and division

Shape:

Year 3: Angles and Shape
 Year 4: Area and perimeter
 Year 4: Shape and symmetry
 Year 4: Position and direction
 Year 4: 3-D Shape
 Year 5: Perimeter and area
 Year 5: Angles
 Year 5: Transformations
 Year 5: 2-D and 3-D shape
 Year 6: Missing angles and length
 Year 6: Coordinates and shape

Statistics:

Year 3: Graphs
 Year 4: Discrete and continuous data
 Year 5: Line graphs and timetables

Measures:

Year 3: Length and Perimeter
 Year 3: Time
 Year 3: Measures
 Year 4: Time
 Year 5: Converting units of measure
 Year 5: Volume

Fractions:

Year 3: Fractions
 Year 4: Fractions
 Year 5: Fractions and decimals
 Year 5: Fractions and percentages
 Year 6: Fractions

3

By the end of the year, students will have knowledge of:

Number:

- Read, write, order and compare numbers to 100
- Calculate mentally using known facts, round and adjust, near doubles, adding on to find the difference
- Derive new facts from a known fact
- Read, write, represent, partition, order and compare 3-digit numbers
- Find 10 and 100 more or less
- Round to the nearest multiple of 10 and 100
- Add and subtract mentally
- Find 10, 100 and 1000 more or less
- Order and compare beyond 1000
- Round numbers

Graphs:

- Collect, interpret and present data using charts and tables

Addition and subtraction:

- Develop and use a range of mental calculation strategies
- Illustrate and explain formal written methods – column method

Multiplication and Division:

- Multiplication and division facts for 2, 3, 4, 5, 6, 8 and 10
- Multiplicative structures: equal groups/parts, change and comparison, correspondence problems
- Relationships: commutativity and inverse
- Multiply a 2-digit number by 2, 3, 4, 5 and corresponding division situations
- Divide 2-digit by a 1-digit

Time:

- Tell, record, write and order the time analogue and digital
- 12-hour, a.m., p.m.
- Measure, calculate and compare durations

Fraction:

- Part-whole relationships
- Fractions as part of a whole or a whole set and as a number
- Add, subtract, compare and order fractions

Angles and shape:

- Identify angles including right angles and recognise as a quarter of a turn
- Identify and draw parallel and perpendicular lines
- Draw/make, classify and compare 2-D and 3-D shapes
- Measure the perimeter

Measure:

- Read scales with different intervals when measuring mass and volume

Number Sense:

Year 4: Reasoning with large numbers
Year 4: Decimals
Year 4: Reasoning with patterns and sequences
Year 5: Reasoning with large whole integers
Year 5: Fractions and decimals
Year 5: Problem solving
Year 6: Integers and decimals
Year 6: Calculation problems
Year 6: Decimals and measure
Year 6: Percentage and statistics
Year 6: Proportion problems

Addition and Subtraction

Year 4: Addition & Subtraction
Year 5: Integer addition and subtraction
Year 5: Calculating with whole numbers and decimals

Multiplication & Division

Year 4: Multiplication and Division
Year 4: Securing multiplication facts
Year 5: Multiplication and divisions
Year 6: Multiplication and division

Shape:

Year 4: Area and perimeter
Year 4: Shape and symmetry
Year 4: Position and direction
Year 4: 3-D Shape
Year 5: Perimeter and area
Year 5: Angles
Year 5: Transformations
Year 5: 2-D and 3-D shape
Year 6: Missing angles and length
Year 6: Coordinates and shape

Statistics:

Year 4: Discrete and continuous data
Year 5: Line graphs and timetables

Measures:

Year 4: Time
Year 5: Converting units of measure
Year 5: Volume

Fractions:

Year 4: Fractions
Year 5: Fractions and decimals
Year 5: Fractions and percentages
Year 6: Fractions

	<ul style="list-style-type: none"> • Weigh and compare masses and capacities with mixed units • Estimate mass and capacity 	
4	<p>By the end of the year, students will have knoweldge of:</p> <p><u>Number:</u></p> <ul style="list-style-type: none"> • 4-digit place value. Read, write, represent, order and compare • Find 10, 100 or 1000 more or less • Round numbers to the nearest 10, 100 or 1000 <p><u>Addition and subtraction:</u></p> <ul style="list-style-type: none"> • Select appropriate strategies to add and subtract • Illustrate and explain appropriate addition and subtraction strategies including column method with regrouping <p><u>Multiplication and division:</u></p> <ul style="list-style-type: none"> • Distributive property including multiplying three 1-digit numbers • Mental multiplication and division strategies using place value and known and derived facts • Short multiplication and division • Identify and explore patterns in multiplication tables including 7 and 9 <p><u>Data:</u></p> <ul style="list-style-type: none"> • Read, interpret and construct pictograms, bar charts and time graphs • Compare tables, pictograms and bar charts <p><u>Fraction:</u></p> <ul style="list-style-type: none"> • Explore different interpretations and representations of fractions • Equivalent fractions • Represent fractions greater than one as mixed number and improper fractions • Add and subtract fractions with the same denominator including fractions greater than one <p><u>Time:</u></p> <ul style="list-style-type: none"> • Analogue to digital, 12- hour and 24-hour •Convert between units of time <p><u>Decimals:</u></p> <ul style="list-style-type: none"> • Decimal equivalents to tenths, quarters and halves • Compare and order numbers with same number of decimal places • Multiply and divide by <p><u>Area and perimter:</u></p> <ul style="list-style-type: none"> • Perimeter of rectangles and rectilinear shapes • Area of rectangles and rectilinear shapes • Investigate area and perimeter <p><u>Money:</u></p> <ul style="list-style-type: none"> • Convert units of measure • Select appropriate units to measure • Use strategies to investigate problems: trial and improvement, organising using lists and tables, working systematically 	<p><u>Number Sense:</u></p> <p>Year 5: Reasoning with large whole intergers</p> <p>Year 5: Fractions and decimals</p> <p>Year 5: Problem solving</p> <p>Year 6: Integers and decimals</p> <p>Year 6: Calculation problems</p> <p>Year 6: Decimals and measure</p> <p>Year 6: Percentage and statistics</p> <p>Year 6: Proportion problems</p> <p><u>Addition and Subtraction</u></p> <p>Year 5: Integer addition and subtraction</p> <p>Year 5: Calculating with whole numbers and decimals</p> <p><u>Multiplication & Division</u></p> <p>Year 5: Multiplication and divisions</p> <p>Year 6: Multiplication and division</p> <p><u>Shape:</u></p> <p>Year 5: Perimeter and area</p> <p>Year 5: Angles</p> <p>Year 5: Transformations</p> <p>Year 5: 2-D and 3-D shape</p> <p>Year 6: Missing angles and length</p> <p>Year 6: Coordinates and shape</p> <p><u>Statistics:</u></p> <p>Year 5: Line graphs and timetables</p> <p><u>Measures:</u></p> <p>Year 5: Converting units of measure</p> <p>Year 5: Volume</p> <p><u>Fractions:</u></p> <p>Year 5: Fractions and decimals</p> <p>Year 5: Fractions and percentages</p> <p>Year 6: Fractions</p>

	<p><u>Shape:</u></p> <ul style="list-style-type: none"> • Classify, compare and order angles • Compare and classify 2-D shapes • Identify lines of symmetry <p><u>Position and direction:</u></p> <ul style="list-style-type: none"> • Describe and plot using coordinates • Describe translations <p><u>Patterns:</u></p> <ul style="list-style-type: none"> • Roman numerals up to 100 • Place value of other number systems • Number sequences and patterns <p><u>3-D Shape:</u></p> <ul style="list-style-type: none"> • Use understanding of 3-D shapes • Identify 3-D shapes from 2-D representations 	
5	<p>By the end of the year, students will have knowledge of:</p> <p><u>Number:</u></p> <ul style="list-style-type: none"> • Read, write, order and compare numbers up to one million • Round numbers within one million to the nearest multiple of powers of ten • Read Roman numerals up to M <p><u>Addition and subtraction:</u></p> <ul style="list-style-type: none"> • Use rounding to estimate • Use a range of mental calculation strategies to add and subtract integers • Illustrate and explain the written method of column addition and subtraction • Select efficient calculation strategies <p><u>Multiplication and division:</u></p> <ul style="list-style-type: none"> • Identify multiples and factors • Investigate prime numbers • Multiply and divide by 10, 100 and 1000 (integers) • Derived facts • Illustrate and explain formal multiplication and division strategies such as short and long division • Use a range of mental calculation strategies <p><u>Data:</u></p> <ul style="list-style-type: none"> • Complete, read and interpret data presented in line graphs • Read and interpret timetables including calculating intervals <p><u>Fraction:</u></p> <ul style="list-style-type: none"> • Read, write, order and compare decimals • Round decimals to the nearest whole number • Represent, identify, name, write, order and compare fractions (including improper and mixed numbers) • Calculate fractions of amounts • Add, subtract fractions with denominators that are multiples of the same number • Multiply fractions (and mixed numbers) by a whole number 	<p><u>Number Sense:</u> Year 6: Integers and decimals Year 6: Calculation problems Year 6: Decimals and measure Year 6: Percentage and statistics Year 6: Proportion problems</p> <p><u>Addition and Subtraction</u> Year 6: Calculation problems</p> <p><u>Multiplication & Division</u> Year 6: Multiplication and division</p> <p><u>Shape:</u> Year 6: Missing angles and length Year 6: Coordinates and shape</p> <p><u>Statistics:</u> Year 6: Percentage and statistics</p> <p><u>Measures:</u> Year 6: Proportion problems</p> <p><u>Fractions:</u> Year 6: Fractions</p>

	<ul style="list-style-type: none"> • Explore percentage, decimal, fractions equivalence • Mental strategies to add and subtract involving decimals • Formal written strategies to add, subtract and multiply involving decimals • Multiply and divide by 10, 100 and 1000 involving decimals • Derive multiplication facts involving decimals <p><u>Area and perimeter:</u></p> <ul style="list-style-type: none"> • Investigate area and perimeter of rectilinear shapes • Estimate area of nonrectilinear shapes <p><u>Shape:</u></p> <ul style="list-style-type: none"> • Classify, compare and order angles • Measure and draw angles with a protractor • Understand and use angle facts to calculate missing angles <p><u>Measure:</u></p> <ul style="list-style-type: none"> • Convert between metric units of length, mass and capacity and units of time • Know and use approximate conversion between imperial and metric • Use cube numbers and notation • Estimate volume • Convert units of volume <p><u>3-D Shape:</u></p> <ul style="list-style-type: none"> • Classify 2-D shapes and reason about regular and irregular polygons • Properties of diagonals of quadrilaterals • Classify 3-D shapes • 2-D representations of 3-D shapes. <p><u>Transformations:</u></p> <ul style="list-style-type: none"> • Coordinates in all four quadrants • Translation and reflection • Calculate intervals across zero as a context for negative numbers 	
6	<p>By the end of the year, students will have knowledge of:</p> <p><u>Integers and decimals</u></p> <ul style="list-style-type: none"> • Represent, read, write, order and compare numbers up to ten million • Round numbers, make estimates and use this to solve problems in context • Solve multi-step problems involving addition and subtraction <p><u>Multiplication and division</u></p> <ul style="list-style-type: none"> • Identify and use properties of number, focusing on primes • Multiply larger integers and decimal numbers using a range of strategies • Divide integers by 1-digit and 2-digit numbers representing remainders appropriately • Illustrate and explain formal multiplication and division strategies <p><u>Calculation problems</u></p> <ul style="list-style-type: none"> • Understand the use of brackets • Use knowledge of the order of operations to carry out calculations • Generate and describe linear number sequences • Express missing number problems algebraically 	<p>Primary students will leave BDA with a secure knowledge of mathematics in the following areas: Number Sense, Addition and Subtraction, Multiplication & Division, Shape, Statistics, Money, Measures, Fractions, which will provide the foundations needed for secondary school.</p>

	<ul style="list-style-type: none"> • Solve equations with unknown values <p><u>Fractions</u></p> <ul style="list-style-type: none"> • Deepen understanding of equivalence • Order, simplify and compare fractions, including those greater than one • Recall equivalence between common fractions and decimals • Find decimal quotients using short division • Add and subtract fractions <p><u>Missing angles and length</u></p> <ul style="list-style-type: none"> • Compare and classify a range of geometric shapes • Use angle facts to find unknown angles <p><u>Coordinates and shapes</u></p> <ul style="list-style-type: none"> • Draw a range of geometric shapes using given dimensions and angles • Describe, draw, translate and reflect shapes on a co-ordinate plane • Recognise and construct 3-D shapes • Name and illustrate parts of a circle <p><u>Fraction</u></p> <ul style="list-style-type: none"> • Represent multiplication involving fractions • Multiply two proper fractions • Divide a fraction by an integer <p><u>Decimals and measure</u></p> <ul style="list-style-type: none"> • Use, read, write and convert between standard units of measures; length, mass, time, money and volume as well as imperial units • Calculate the area of parallelograms and triangles • Calculate, estimate and compare the volume of cuboids <p><u>Percentage and statistics</u></p> <ul style="list-style-type: none"> • Calculate and compare percentages of amounts • Connect percentages with fractions • Explore the equivalence of fractions, decimals and percentages • Calculate the mean • Construct and interpret lines graphs and pie charts • Compare pie charts <p><u>Proportion problems</u></p> <ul style="list-style-type: none"> • Use fractions to express proportion • Identify ratio as a relationship between quantities and as a scale factor • Unequal sharing involving ratio 	
<p>KS3</p>	<p>By the end of the Key Stage, students will be able to:</p> <p>Know that concrete, pictorial and abstract representations are an important part of developing students' conceptual understanding.</p>	<p>Use and apply standard techniques:</p> <p>Students should be able to:</p> <ul style="list-style-type: none"> • accurately recall facts, terminology and definitions • use and interpret notation correctly <p>accurately carry out routine procedures or set tasks requiring multi-step solutions.</p>

	<p>Become fluent in the fundamentals of mathematics, 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.</p>	
<p>KS4</p>	<p>By the end of the Key Stage, students will be able to:</p> <ul style="list-style-type: none"> • 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. • Communicate, justify, argue and prove using mathematical vocabulary. 	<p>Reason, interpret and communicate mathematically:</p> <p>Students should be able to:</p> <ul style="list-style-type: none"> • make deductions, inferences and draw conclusions from mathematical information. • construct chains of reasoning to achieve a given result. • interpret and communicate information accurately. • present arguments and proofs. • assess the validity of an argument and critically evaluate a given way of presenting information. <p>Solve problems within mathematics and in other contexts:</p> <p>Students should be able to:</p> <ul style="list-style-type: none"> • translate problems in mathematical or nonmathematical contexts into a process or a series of mathematical processes. • make and use connections between different parts of mathematics. • interpret results in the context of the given problem. • evaluate methods used and results obtained. • evaluate solutions to identify how they may have been affected by assumptions made.
<p>KS5</p>	<p>By the end of the Key Stage, students will be able to:</p>	<p>Use and apply standard techniques:</p> <p>Students should be able to:</p>

- 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.
- Communicate, justify, argue and prove using mathematical vocabulary.
- Develop their character, including resilience, confidence and independence, so that they contribute positively to the life of the school, their local community and the wider environment.

- select and correctly carry out routine procedures.
 - accurately recall facts, terminology and definitions
- Reason, interpret and communicate mathematically:**

Students should be able to:

- construct rigorous mathematical arguments (including proofs)
- make deductions and inferences.
- assess the validity of mathematical arguments. explain their reasoning.
- use mathematical language and notation correctly

Solve problems within mathematics and in other contexts:

- translate problems in mathematical and nonmathematical contexts into mathematical processes.
- interpret solutions to problems in their original context, and, where appropriate, evaluate their accuracy and limitations.
- translate situations in context into mathematical models.
- use mathematical models.
- evaluate the outcomes of modelling in context, recognise the limitations of models and, where appropriate, explain how to refine them.

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year R	Topic	Number	Number	Number	Number	Shape, number, measures	Measures, number
	Content	-Early mathematical experiences -Pattern and early number -Numbers within 6	-Addition and subtraction within 6 -Measures Shape and sorting -Calendar and time	-Numbers within 10 -Addition and subtraction within 10 -Numbers within 15	-Grouping and sharing -Numbers within 20 -Doubling and halving	-Shape and pattern -Addition and subtraction within 20 - Money	- Measures -Depths of numbers within 20 -Numbers beyond 20
	Assessment	Teacher assessment	Teacher assessment	Teacher assessment	Teacher assessment	Teacher assessment	Teacher assessment
Year 1	Topic	Number, Shape	Number	Measures, Number	Number, Fractions, Measure	Number, Measures	Number, Measures
	Content	-Numbers to 10 -Addition and subtraction within 10 -Shape and pattern	-Numbers to 20 -Addition and subtraction	-Time -Exploring calculation strategies within 20 -Numbers to 50 -Addition and subtraction within 20	-Addition and subtraction within 20 -Fractions -Measures: length and mass	-Numbers beyond 50 to 100 and beyond -Addition and subtraction -Money	-Multiplication and division -Measures: capacity and volume
	Assessment	Formative pre and post unit quizzes	Formative pre and post unit quizzes	PUMA Formative pre and post unit quizzes	Formative pre and post unit quizzes	Formative pre and post unit quizzes	PUMA – Summer Year 1 Formative pre and post unit quizzes
Year 2	Topic	Number	Measures, Statistics, Number	Measure, Fractions, Number	Measure, Geometry	Number, Measures,	Number
	Content	-Numbers within 100 -Addition and subtraction of 2 digit numbers -Addition and subtraction word problems	-Measures: length -Multiplication and division:2,5,10	-Multiplication and division -Time -Fractions	-Addition and subtraction of 2 digit numbers -Money -Face, shapes, lines and turns	-Numbers within 1000 Measures: capacity and volume -Measures: mass	-Exploring calculation strategies -Multiplication and division: 3 and 4
	Assessment	Baseline PUMA - Summer Year 1 Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	PUMA Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes Practise SATs	SATs
Year 3	Topic	Number, Statistics	Number, Measures	Number and Measures	Measures and Fractions	Geometry, Measures	Number
	Content	-Number sense and exploring calculation strategies -Place value -Graphs	-Addition and subtraction -Length and perimeter	-Multiplication and division -Deriving multiplication and division facts -Time	-Time -Fractions	-Angles and shape -Measures	-Securing multiplication and division -Exploring calculation strategies and place value
	Assessment	Baseline PUMA - Summer Year 2 Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	PUMA Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic PUMA – Summer Year 3 Formative pre and post unit quizzes
Year 4	Topic	Number	Number, Statistics	Number, Fraction, Measure	Number, Geometry	Measure, Geometry	Geometry, Number
	Content	-Reasoning with large numbers -Addition and subtraction -Multiplication and division	-Discrete and continuous data -Multiplication and division	-Fractions -Time	-Decimals -Area and perimeter	-Solving measures and money problems -Shape and symmetry	-Position and direction -Reasoning with pattern and sequence -3D shape

	Assessment	Baseline PUMA - Summer Year 3 Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	PUMA Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	Multiplication tables check Cumulative arithmetic PUMA
Year 5	Topic	Number, Statistics	Number, Geometry	Fractions, Numbers, Geometry	Fractions, Geometry	Measures, Number, Geometry	Measures, Number
	Content	-Reasoning with large whole integers -Integer addition and subtraction -Line graphs and timetables	-Multiplication and division -Perimeter and area -Yr 4 2D shape (extra unit)	-Fractions and decimals -Angles	-Fractions and percentages -Transformations	-Converting units of measure -Calculating with whole numbers and decimals -2D and 3D shape	-2D and 3D shape -Volume -Problem-solving
	Assessment	Baseline PUMA - Summer Year 4 Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	PUMA Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Formative pre and post unit quizzes	Cumulative arithmetic Mock SATs Formative pre and post unit quizzes	Cumulative arithmetic Mock SATs Formative pre and post unit quizzes
Year 6	Topic	Number	Number, Fraction, Geometry	Geometry, Fractions, measures	Number, Statistics, Fractions	Consolidation	Consolidation
	Content	-Integers and decimals -Multiplication and division	-Calculation problems -Fractions -Missing angles and length	-Coordinates and shapes -Fractions -Decimals and measure	-Decimals and measure -Percentages and statistics -Proportion problems		
	Assessment ARK Arithmetic test	Arithmetic PUMA – Y5 Summer	Mock SATs Arithmetic	Mock SATs Arithmetic	Mock SATs Arithmetic test	SATs	

Implementation

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7 Higher Sets: 1 – 3	Topic	Number Systems 1	Number Skills, Equations, functions and formulae.	Fractions, Decimals.	Angles, Equations.	Multiplicative reasoning, Perimeter, area and volume.	Analysing and Displaying Data, Real-life Graphs
	Content	Place Value; Axioms & arrays; Factors & multiples; Order of operations	Factors, primes and multiples, Using negative numbers, Multiplying and dividing, Squares and square roots, More powers and roots, Calculations. Simplifying algebraic expressions, Writing algebraic expressions, STEM: Using formulae, Writing formulae, Brackets and powers, Factorising expressions.	Working with fractions, Adding and subtracting fractions, Fractions, decimals and percentages, Multiplying and dividing fractions, Working with mixed numbers. Ordering decimals, Rounding decimals, Adding and subtracting decimal, Multiplying decimals, Dividing decimals, Fractions, decimals and percentages, FINANCE: Working with percentages.	Angles and parallel lines, Triangles, Quadrilaterals, Polygons. Solving one-step equations, Solving two-step equations, More complex equations, Trial and improvement	STEM: Metric and imperial units, Writing ratios, Sharing in a given ratio, Proportion, Proportional reasoning, Using the unitary method. Triangles, parallelograms and trapeziums, Perimeter and area of compound shapes, Properties of 3D solids, Surface area, Volume, 8f. STEM: Measures of area and volume.	Two-way tables and bar charts, Averages and range, Grouped data, More graphs, Pie charts, STEM: Scatter graphs and correlation. Direct proportion, FINANCE: Interpreting financial graphs, Distance-time graphs, Rates of change, Misleading graphs.
	Assessment	Hegarty Maths Quizzes	Cumulative assessment Aut 2	Hegarty Maths Quizzes	Cumulative assessment Spr 2	Hegarty Maths Quizzes	Cumulative assessment Sum 2

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7 Foundation Sets: 4 – 6	Topic	Number Systems 1	Calculating, Expressions, Functions and Formulae.	Factors and Multiples, Decimals and Measures	Angles and Lines, Measuring and Shapes	Fractions, Decimals and Percentages, Number Properties and Calculating	Analysing and Displaying Data, Graphs
	Content	Place Value; Axioms & arrays; Factors & multiples; Order of operations	Adding, Subtracting, Multiplying, Dividing, Multiplying and dividing by 10, 100 and 1000, Using the four operations, Positive and negative numbers Using functions, Function machines, Simplify expressions, Writing expressions, STEM: Using formulae, Writing formulae.	Number rules and relationships, Multiples, Multiplication, Division, Solving problems, Factors and primes, Common factors and multiples. Estimates and measures, Decimal numbers, Metric units, Adding and subtracting decimals, Rounding, Multiplying and dividing decimals, FINANCE: Calculating with money.	Right angles and lines, Measuring angles 1, Measuring angles 2, Drawing and estimating angles, Putting angles together. Shapes, Symmetry in shapes, More symmetry, Regular polygons, Perimeter, Area.	Comparing fractions, Equivalent fractions, Calculating with fractions, Adding and subtracting fractions, Introducing percentages, FINANCE: Finding percentages. Adding and subtracting with larger numbers, More calculations, Negative numbers, STEM: Writing ratios, Using ratios to solve problems, Multiplicative reasoning	Tables and pictograms, Bar charts, Grouped data, Mode and modal class, Range and median, Mean. Real-life graphs, Coordinates, Graphs of functions, STEM: Scientific graphs
	Assessment	Hegarty Maths Quizzes	Cumulative assessment Aut 2	Hegarty Maths Quizzes	Cumulative assessment Spr 2	Hegarty Maths Quizzes	Cumulative assessment Sum 2

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8 Higher tier Sets: 1 – 3	Topic	Number Systems 1	Factors and powers, Working with powers.	Fractions, decimals and percentages, Sequences and Graphs.	2D shapes and 3D solids, Graphs	Probability, Transformations.	Constructions and Loci, Scale Drawings and Measures.
	Content	Place Value; Axioms & arrays; Factors & multiples; Order of operations	Prime factor decomposition, Laws of indices, STEM: Powers of 10, Calculating and estimating. Simplifying expressions, More simplifying, Expanding and simplifying, Substituting and solving.	Recurring decimals, Using percentages, Percentage change, FINANCE: Repeated percentage change. Sequences, The nth term, Pattern sequences, Coordinates and line segments, Graphs.	Plans and elevations, Surface area of prisms, Volume of prisms, Circumference of a circle, Area of a circle, Cylinders, Pythagoras' theorem. Plotting linear graphs, The gradient, $y = mx + c$, Parallel and perpendicular lines, Inverse functions, STEM: Non-linear graphs.	Comparing probabilities, Mutually exclusive events, Estimating probability, Experimental probability, Probability diagrams, Tree diagrams. Reflection and translation, Rotation, Enlargement, More enlargement, STEM: Combining transformations, 2D shapes and 3D solids.	Accurate drawings, Constructing shapes, Constructions 1, Constructions 2, Loci. Maps and scales, Bearings, Scales and ratio, Congruent and similar shapes, Solving geometry problems.
	Assessment	Hegarty Maths Quizzes	Cumulative assessment Aut 2	Hegarty Maths Quizzes	Cumulative assessment Spr 2	Hegarty Maths Quizzes	Cumulative assessment Sum 2

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8 Foundation Sets: 4 – 7	Topic	Number Systems 1	Decimal calculations, Number properties	Expressions and equations, Sequences.	Shapes and measures in 3D, Angles	Fractions and percentages, Probability.	Statistics, Transformations.
	Content	Place Value; Axioms & arrays; Factors & multiples; Order of operations	Adding and subtracting decimals, Multiplying decimals, Ordering and rounding decimals, STEM: Problem-solving with decimals. Squares, cubes and roots, Calculating with brackets and indices, LCM and HCF, Prime factor decomposition	Simplifying expressions, Functions, Solving equations, Using brackets. Generating sequences, Extending sequences, Special sequences, Position-to-term rules, Finding the nth term.	3D solids, Nets of 3D solids, Surface area, Volume, Working with measures. Measuring and drawing angles, Vertically opposite angles, Angles in triangles, Drawing triangles accurately, Designing nets	Comparing fractions, Fractions of amounts, Adding and subtracting fractions, Fractions and percentages, Calculating percentages, STEM: Percentages and proportion. The language of probability, Outcomes, Probability calculations, Experimental probability, FINANCE: Comparing probabilities.	Data collection sheets, Interpreting bar charts, Drawing bar charts, STEM: Pie charts. Reflection, Translation, Rotation, STEM: Congruency.
	Assessment	Hegarty Maths Quizzes	Cumulative assessment Aut 2	Hegarty Maths Quizzes	Cumulative assessment Spr 2	Hegarty Maths Quizzes	Cumulative assessment Sum 2

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9 Higher tier Sets: 1 – 3	Topic	Number	Algebra	Fractions, Ratio and Proportion	Equations and Inequalities	Angles and Trigonometry	More Trigonometry
	Content	Number problems and reasoning, Place value and estimating, HCF and LCM, Calculating with powers (indices), Zero, negative and fractional indices, Powers of 10 and standard form, Surds	Algebraic Indices, Expanding and Factorising, Equations, Formulae, Linear Sequences, Non-linear sequences, More expanding and factorising	Fractions, Ratios, Ratio and Proportion, Percentages, Fractions, Decimals and Percentages	Solving quadratic equations 1, Solving quadratic equations 2, Completing the square, Solving, More Simultaneous Equations, Solving linear and quadratic simultaneous equations, Solving linear inequalities	Angle properties of triangles and quadrilaterals, Interior angles of a polygon, Exterior angles of a polygon, Pythagoras' theorem 1, Pythagoras' theorem 2, Trigonometry 1, Trigonometry 2	Accuracy, Graph of the sine function, Graph of the cosine function, The tangent function, Calculating areas and the sine rule, The cosine rule and 2D trigonometric problems, Solving problems in 3D, Transforming trigonometric graphs 1, Transforming trigonometric graphs 2
	Assessment	Mini-tests on each topic	Cumulative assessment Aut 2	Mini-tests on each topic	Cumulative assessment Spr 2	Mini-tests on each topic	Cumulative assessment Sum 2

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9 Foundation tier Sets: 4 – 7	Topic	Number; Algebra	Algebra; Fractions and Percentages	Fractions, Indices and Standard Form; Probability	Probability; Perimeter, Area and Volume 1	Perimeter, Area and Volume 2	
	Content	Calculations Rounding and Estimation Decimal numbers Place value Factors and multiples Squares, cubes and roots and	Expanding brackets Factorising Using formulae Working with fractions, Operations with fractions Multiplying fractions	Multiplying and dividing fractions The laws of indices Writing numbers in standard form Calculating with standard form Calculating probability	Venn diagrams, Tree diagrams, More tree diagrams Rectangles, parallelograms and triangles, Trapezia and changing units,	Circumference of a circle 1, Circumference of a circle 2, Area of a circle, Semicircles and sectors, Composite 2D shapes and cylinders,	

		Index notation Prime factors Algebraic expressions Simplifying expressions Substitution	Dividing fractions Fractions and decimals Fractions and percentages,	Two events Experimental probability	Area of compound shapes, Surface area of 3D solids, Volume of prisms, More volume and surface area	Pyramids and cones, Spheres and composite solids	
	Assessment	Mini-tests on each topic	Cumulative assessment Aut 2	Mini-tests on each topic	Cumulative assessment Spr 2	Mini-tests on each topic	Cumulative assessment Sum 2

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10 Higher tier Sets: 1 – 3	Topic	More Algebra; Graphs	Equations and Graphs; Area and Volume	Similarity and Congruence; Transformations and Constructions	Multiplicative Reasoning; Probability	Interpreting and Representing Data;	Further Statistics; Revision for Mock Exams
	Content	Rearranging formulae Algebraic fractions Simplifying algebraic fractions More algebraic fractions Surds Solving algebraic fraction equations Functions Algebraic Proof Linear graphs More linear graphs, Graphing rates of change Real-life graphs Line segments Quadratic graphs	Solving simultaneous equations graphically Representing inequalities graphically Graphs of quadratic functions Solving quadratic equations graphically Graphs of cubic functions. Perimeter and area Units and accuracy Prisms Circles Sectors of circles Cylinders and spheres Pyramids and cones.	Congruence Geometric proof and congruence Similarity More similarity Similarity in 3D solids 3D solids Reflection and rotation Enlargement Transformations and combinations of transformations Bearings and scale drawings Constructions 1 Constructions 2 Loci	Growth and decay Compound measures More compound measures Ratio and proportion Combined events Mutually exclusive events Experimental probability Independent events and tree diagrams Conditional probability Venn diagrams and set notation	Statistical diagrams 1 Time Series Scatter Graphs Line of best fit Averages and Range Statistical Diagrams 2	Sampling Cumulative frequency Box plots Drawing histograms Interpreting histograms Comparing and describing populations

		Cubic and reciprocal graphs					
	Assessment	More graphs Mini-tests on each topic	Cumulative assessment Aut 2	Mini-tests on each topic	Cumulative assessment Spr 2	Mini-tests on each topic	Cumulative assessment Sum 2
		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10 Foundation tier Sets: 4 – 7	Topic	Equations, Inequalities and Sequences; Graphs	Graphs and Quadratic Equations; Angles	Right-angle Triangles; Constructions, Loci and Bearings	Averages and Range; Graphs, Tables and Charts	Ratio and Proportion; Multiplicative Reasoning	Transformations
	Content	Solving equations 1 Solving equations 2 Solving equations with brackets Introducing inequalities Solving Linear Inequalities Integer solutions to Inequalities Substituting into Formulae Subject of Formulae Generating Sequences Using Nth term of linear sequences Finding Nth term of linear sequences Coordinates Linear Graphs Gradient of Straight Line Equation of a straight line from graph ($y=mx+c$)	Real-life Graphs Distance-time graphs Expanding double brackets Plotting quadratic graphs Using quadratic graphs Factorising quadratic expressions Solving quadratic equations graphically Properties of shapes Angles in parallel lines Angles in triangles Exterior and interior angles Geometrical patterns	Pythagoras' theorem 1, Pythagoras' theorem 2, Trigonometry: the sine ratio 1, Trigonometry: the sine ratio 2, Trigonometry: the cosine ratio, Trigonometry: the tangent ratio, Finding lengths and angles using trigonometry, 3D solids, Plans and elevations, Accurate drawings 1, Scale drawings and maps, Accurate drawings 2, Constructions, Loci and regions, Bearings,	Mean and range, Mode, median and range, Types of average, Estimating the mean, Sampling Frequency tables, Two-way tables Representing data, Time series, Stem and leaf diagrams, Pie charts, Scatter graphs, Line of best fit	Writing Ratios Using Ratios Ratio and Measures Comparing with Ratios Using Proportion Proportion and Graphs Ratio and proportion problems Percentages, Growth and decay, Compound measures, Distance, speed and time, Direct and inverse proportion	

	Assessment	Mini-tests on each topic	Cumulative assessment Aut 2	Mini-tests on each topic	Cumulative assessment Spr 2	Mini-tests on each topic	Cumulative assessment Sum 2
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		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11 Higher tier Sets: 1 - 3	Topic	Circle Theorems; Vectors and geometric proof	Proportion and Graphs	Proportion and Graphs	Revision Exams		Exams
	Content	Radii and chords Tangents Angles in circles 1 Angles in circles 2 Applying circle theorems. Vectors and vector notation Vector arithmetic More vector arithmetic Parallel vectors and collinear points Solving geometric problems.	Direct proportion More direct proportion Inverse proportion Exponential functions Non-linear graphs Translating graphs of functions Reflecting and stretching graphs of functions	Direct proportion More direct proportion Inverse proportion Exponential functions Non-linear graphs Translating graphs of functions Reflecting and stretching graphs of function`s Reteaching Key topics – Mock exam analysis, Bespoke Scheme of learning based on question level analysis	Bespoke Scheme of learning based on question level analysis Walking talking mock exams		
	Assessment	2 GCSE papers	Mini topic tests	3 GCSE Papers			Exams

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11 Foundation tier Sets: 4 – 7	Topic	Congruence, similarity and vectors	More algebra	More algebra	Revision Exams	Revision Exams	Exams
	Content	Similarity and enlargement More similarity Using similarity Congruence 1 Congruence 2	Graphs of cubic and reciprocal functions Non-linear graphs Solving simultaneous equations graphically Solving simultaneous equations algebraically	Graphs of cubic and reciprocal functions Non-linear graphs Solving simultaneous equations graphically Solving simultaneous equations algebraically	Bespoke Scheme of learning based on question level analysis Walking talking mock exams	Bespoke Scheme of learning based on question level analysis Walking talking mock exams	
	Assessment	2 GCSE papers	Mini topic tests	3 GCSE Papers			Exams

		Vectors 1 Vectors 2	Rearranging formulae Proof.	Rearranging formulae Proof. Reteaching Key topics – Mock exam analysis, Bespoke Scheme of learning based on question level analysis			
Assessment	2 GCSE papers	Mini topic tests	3 GCSE Papers				

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12	Topic	-Algebra and functions -Coordinate Geometry in the (x,y) plane -Statistical Sampling and Data Presentation	-Further Algebra -Trigonometry -Probability -Statistical Distributions -Hypothesis Testing -Kinematics	-Differentiation -Integration -Newton's Laws of motion -Further Kinematics	-Exponentials and Logarithms -Vectors (2D) -Vectors (3D)	-Regression and Correlation -Probability -Normal Distribution -Revision and Exam Preparation	-Proof -Algebraic Fractions
	Content	Algebraic expressions Quadratics Equations and inequalities Graphs and transformations Straight line graphs Circles Statistical sampling Data Collection Introduction to the Large Data Set Data presentation and interpretation Correlation	Algebraic methods The binomial expansion Trigonometric ratios Trigonometric identities and equations Measures of location and spread Probability Statistical distributions Hypothesis testing Quantities and Units in Mechanics Y1 Modelling in Mechanics & Kinematics 1 Constant Acceleration	Differentiating polynomials, gradients, tangents and normal Differentiation Increasing/decreasing functions, Second order derivatives, Stationary points, Sketching gradient functions, Modelling Integrating polynomials, Functions given a gradient function, Definite integration Areas under curves, Areas under x-axis, Areas between curves & lines Forces and Motion Variable acceleration	Exponentials and logarithms Exponential functions, Euler's constant, Modelling, Logarithms Laws of Logarithms, Solving equations using logs, Natural logs, Logs and non-linear data Position vectors, distance between two points, geometric problems Definitions, magnitude/direction, addition and scalar multiplication 3D Vectors	Probability Using set notation, conditional probability, questioning assumptions Regression and Correlation Hypothesis testing on PMCC Using Normal Distribution Hypothesis testing with Normal Distributions	End of year exam revision and re-teach Proof by contradiction, counterexample and direct Partial Fractions
	Assessment	Mini topic tests	AUT2 Assessments	SPR1 Assessments	Mini topic tests	Mini topic tests	SUM1 Assessments

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 13	Topic	-Functions and Modelling -Series and Sequences -Binomial Theorem – Forces at any angle -Application of forces	-Trigonometry -Parametric Equations -Numerical Methods -Moments -Application of Kinematics	-Further Differentiation -Further Integration -Further Kinematics	EXAM PREP	EXAM PREP	EXAM PREP
	Content	Modulus functions/graphs Transformation of graphs Arithmetic sequences Geometric sequences Modelling with sequences Using binomial expansion for non integer values of n Forces applied at an angle Forces on an inclined plane Using coefficient friction between two surfaces Resolving forces with connected particles on inclined plane Modelling using Forces and friction	Trigonometric Functions Introduction to radians Solving equations using radians Introduction to sec, cosec, cot, trig identities, inverse trig functions Solving trig equations involving cot, sec and cosec Expressing as $R\cos(x+a)$ Definition and converting between parametric and Cartesian forms Curve sketching and modelling Location of roots Solving by iterative methods Newton-Raphson method Problem solving with numerical methods Forces' turning effects	Differentiate for more complex expressions using: chain rule, product rule and quotient rule Use implicit differentiation Modelling with differentiation Integrating for more complex expressions using: reverse chain rule, substitution, integration by parts Modelling with integration Using trapezium rule to approximate areas under curves Constant acceleration (equations of motion in 2D; the i, j system) Variable acceleration using Calculus	Bespoke prep based on pupil data	Bespoke prep based on pupil data	Bespoke prep based on pupil data

			Projectiles				
	Assessment	Mini topic tests	AUT2 Assessments	Mini topic tests	Full A Level Papers	Full A Level Papers	Full A Level Papers