## Curriculum Intent

At Bradford Girls' Grammar School, we believe that it is our duty to inspire young people to see the true beauty of Mathematics by bringing maths alive, making it interesting, developing deeper understanding and broaden their understanding of mathematical concepts for an ever more technical future.

These core beliefs and ideals should be modelled in our practice, which promotes the value and enjoyment of the study of Mathematics to students, parents/guardians, and colleagues.

## Curriculum Implementation

**Early Years Foundation Stage**

By the end of EYFS, children should be able to:

- Challenge their mathematical thinking by explaining how they know.
- Count reliably with numbers from 1 to 20 orally and by 1-1 using objects.
- Add and subtract using objects up to the value of 20.
- Solve problems including doubling, halving and sharing using tangible resources.
- Use language around size, weight, capacity, position, distance, time and money to solve problems.
- Use mathematical language to describe characteristics of everyday objects and shapes

**Key Stage 1**
The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of Year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

**Lower Key Stage 2**
The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of Year 4, pupils should have memorised their multiplication tables up to and including the 12-multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

**Upper Key Stage 2**
The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

**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:

- 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.

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.

**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:

- 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.

During Key stage 4 all of our higher and foundation students will be prepared for the Edexcel 9-1 GCSE Mathematics qualification. Entry level is offered to ensure that all students complete KS4 with a recognised qualification in mathematics.

**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; co-ordinate 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.

**Through school retrieval practices:**
The teaching of Mathematics employs a minimum operational standard which is used primarily to embed long term memory. This is done in the first section of the lesson and involves a mixture of past and current short questions. This along with our SOW which has review steps can dictate the additional teaching required in the next set of starters.

**Through school literacy practices:**
Many of the resources used in KS1-4 are generated from the White Rose maths hub and differentiated to reflect the school's ambitious intentions to stretch and challenge pupils in order to deepen their knowledge and develop their mathematical literacy. GSCE and A Level textbooks are used to challenge the most able where appropriate, and all pupils are encouraged to read for meaning during lessons – either aloud in class so that key information and concepts can be discussed and unpicked or individually to build resilience in a certain topic.

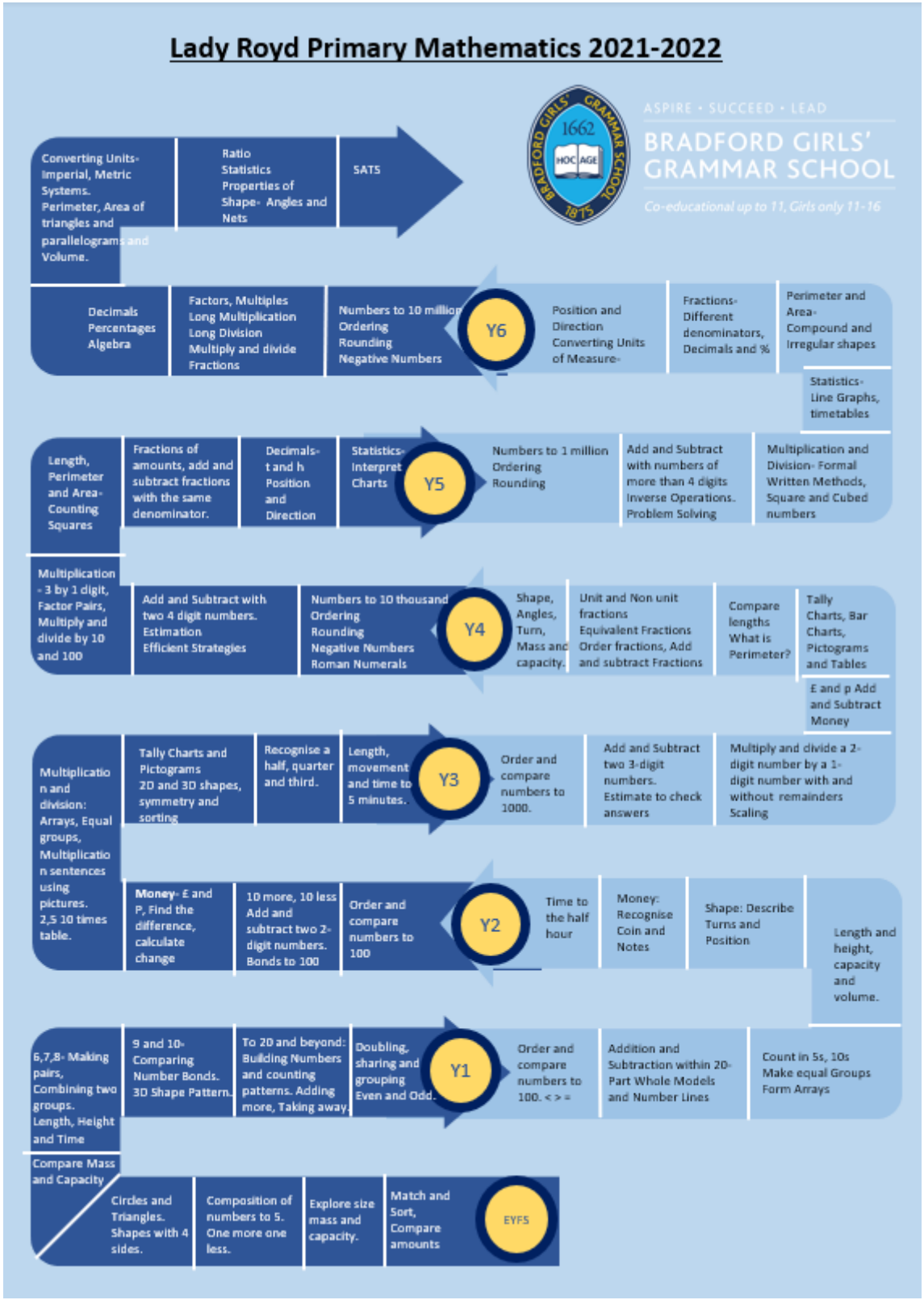
In KS3-5, Knowledge organisers are used throughout the class teaching of mathematical topics. Which helps to supports all abilities by means of keywords associated with topics as well as acting as an excellent revision practice.

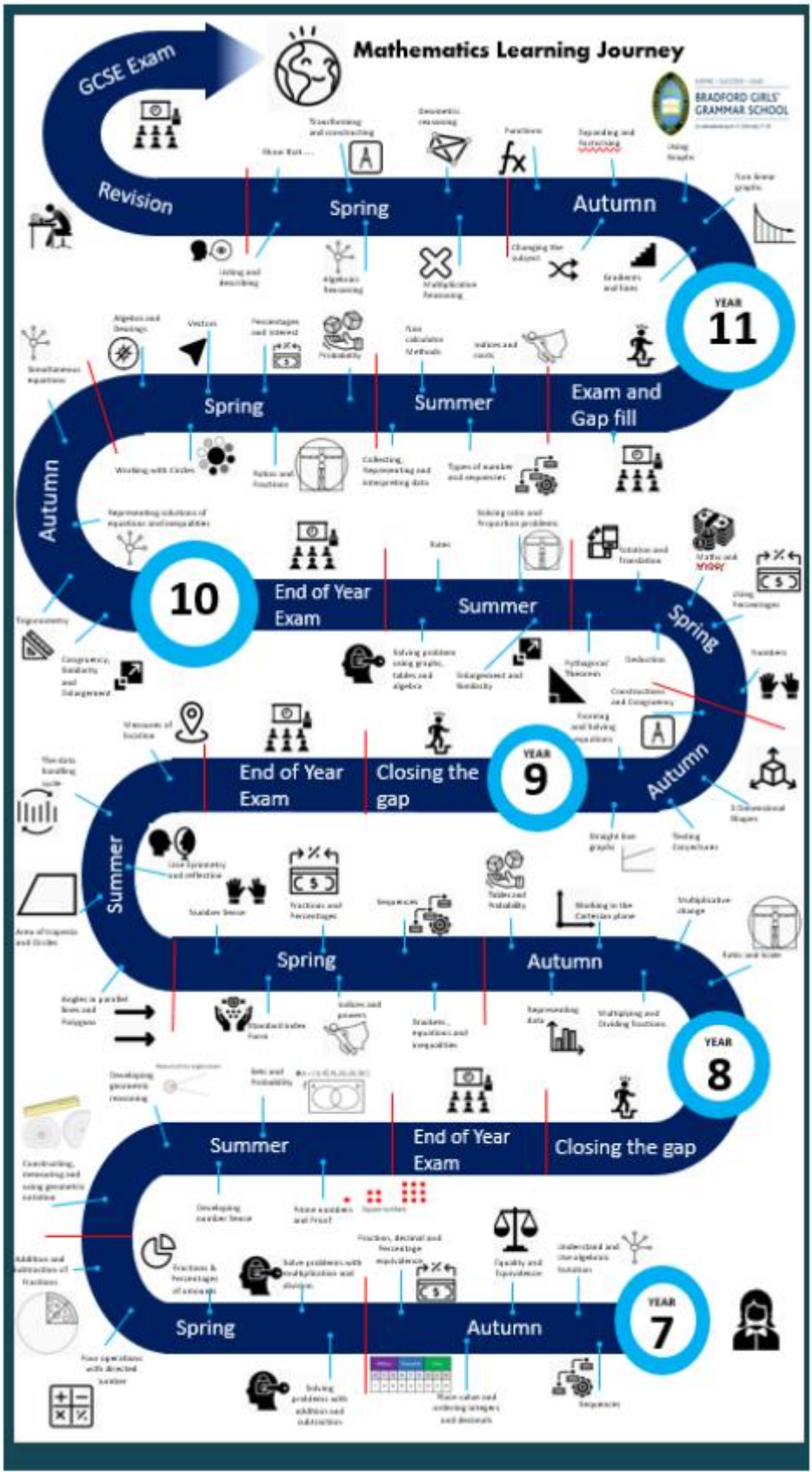
**Through school assessment opportunities:**
Assessment opportunities, both formative and summative, are routinely built into lesson planning at all key stages. Starter tasks regularly check understanding of prior learning, reinforce key vocabulary, and provide students in KS4-5 with opportunities to apply learning to exam questions. Low stakes tests such as end of topic tests are designed to quickly check knowledge and understanding of unit tests. Progress checks and summative termly assessments are built into all Schemes of learning, and end of year and mock exams are synoptic.

## Curriculum Impact

In every Mathematics lesson you should see the following:

- 'Quality first' teaching; tailored to meet the needs of the learners in each class, and immediate intervention to address gaps in learning where necessary,
- Resilient learners with Growth Mindsets and a 'We Can' attitude to Mathematics, whatever their previous level of attainment,
- Teachers using high-quality questioning to explore children's understanding and develop it further.
- Teachers making use of misconceptions to further understanding of key concepts,
- Teachers using a range of methods to explore key Mathematical concepts which appeal to pupils' different styles of learning, employing concrete/pictorial/abstract representations of Mathematical concepts.
- Learners being given the opportunity, through careful planning, to 'linger longer' on and 'go deeper' in mathematical concepts,
- Pupils learning together.
- Development of fluency, reasoning and solving.


Lady Royd Primary Mathematics 2021-2022
ASPIRE • SUCCEED • LEAD
BRADFORD GIRLS' GRAMMAR SCHOOL
Co-educational up to 11, Girls only 11-16
Converting Units- Imperial, Metric Systems. Perimeter, Area of triangles and parallelograms and Volume.
Ratio Statistics Properties of Shape- Angles and Nets
SATS
Decimals Percentages Algebra
Factors, Multiples Long Multiplication Long Division Multiply and divide Fractions
Numbers to 10 million Ordering Rounding Negative Numbers
Y6
Position and Direction Converting Units of Measure-
Fractions- Different denominators, Decimals and %
Perimeter and Area- Compound and Irregular shapes
Statistics- Line Graphs, timetables
Length, Perimeter and Area- Counting Squares
Fractions of amounts, add and subtract fractions with the same denominator.
Decimals- t and h Position and Direction
Statistics- Interpret Charts
Y5
Numbers to 1 million Ordering Rounding
Add and Subtract with numbers of more than 4 digits Inverse Operations. Problem Solving
Multiplication and Division- Formal Written Methods, Square and Cubed numbers
Multiplication - 3 by 1 digit, Factor Pairs, Multiply and divide by 10 and 100
Add and Subtract with two 4 digit numbers. Estimation Efficient Strategies
Numbers to 10 thousand Ordering Rounding Negative Numbers Roman Numerals
Y4
Shape, Angles, Turn, Mass and capacity.
Unit and Non unit fractions Equivalent Fractions Order fractions, Add and subtract Fractions
Compare lengths What is Perimeter?
Tally Charts, Bar Charts, Pictograms and Tables
£ and p Add and Subtract Money
Multiplication and division: Arrays, Equal groups, Multiplication sentences using pictures. 2,5 10 times table.
Tally Charts and Pictograms 2D and 3D shapes, symmetry and sorting
Recognise a half, quarter and third.
Length, movement and time to 5 minutes.
Y3
Order and compare numbers to 1000.
Add and Subtract two 3-digit numbers. Estimate to check answers
Multiply and divide a 2-digit number by a 1-digit number with and without remainders Scaling
Money- £ and P, Find the difference, calculate change
10 more, 10 less Add and subtract two 2-digit numbers. Bonds to 100
Order and compare numbers to 100
Y2
Time to the half hour
Money: Recognise Coin and Notes
Shape: Describe Turns and Position
Length and height, capacity and volume.
6,7,8- Making pairs, Combining two groups. Length, Height and Time
9 and 10- Comparing Number Bonds. 3D Shape Pattern.
To 20 and beyond: Building Numbers and counting patterns. Adding more, Taking away.
Doubling, sharing and grouping Even and Odd.
Y1
Order and compare numbers to 100. < > =
Addition and Subtraction within 20- Part Whole Models and Number Lines
Count in 5s, 10s Make equal Groups Form Arrays
Compare Mass and Capacity
Circles and Triangles. Shapes with 4 sides.
Composition of numbers to 5. One more one less.
Explore size mass and capacity.
Match and Sort, Compare amounts
EYFS


Mathematics Learning Journey
BRADFORD GIRLS' GRAMMAR SCHOOL
GCSE Exam
Revision
Spring
Autumn
YEAR 11
Spring
Summer
Exam and Gap fill
Autumn
10
End of Year Exam
Summer
Spring
End of Year Exam
Closing the gap
YEAR 9
Autumn
Summer
Spring
Autumn
YEAR 8
Summer
End of Year Exam
Closing the gap
Spring
Autumn
YEAR 7