

Mathematics

Curriculum principles

By the end of their education, a student of mathematics at Dixons Brooklands Academy will:

- know the fundamental skills in mathematics which allow students to understand how to use this knowledge in future learning and employment. These include money management; reading timetables; discovering and understanding patterns in data and being able to solve problems.
- recognise the beauty in sophisticated mathematical methods; be analytical thinkers and have a thirst for mathematical reasoning. On leaving Dixons Brooklands Academy, students will have developed fluency in procedures and be keen problem solvers.

It is the vision of the Mathematics Department at Dixons Brooklands Academy to equip all young people with basic numeracy, problem-solving and logic skills, in stimulating learning environments. These fundamental skills should be both intrinsically mathematical, and essential for everyday life.

In order to achieve a true understanding of mathematics, topics have been intelligently sequenced based on the following rationale:

- the overall aim of the mathematics curriculum is to provide students with the knowledge they need to increase their cultural capital and be successful in their lives beyond the academy. With this in mind, the schemes of work sequence topics in an order closely following that set out by the 'mathematics Mastery Programme'. Adopting a spiral curriculum, in which topic areas are revisited and extended on a yearly basis, this sequence of learning promotes a deeper understanding of the mathematical concepts being taught, both in-line with the National Curriculum and in the wider domain.
- within the classroom, all through, lessons roughly follow a similar lesson format: Do Now, New Learning, Develop Learning, Independent Task, Plenary. In key stage 3, there is more emphasis to develop deeper understanding whilst key stage 4 spend more time on practice and application to promote resilience and independence. Key stage 3 synthesise knowledge learned in a lesson with an exam question and there is a greater emphasis on this in key stage 4 to provide students with applied practice, underpinned by real life contexts. In accordance with the curriculum overview, each key stage promotes a slight variation in pedagogy suitable to the students' developmental stage, whilst continuing to promote ambitious expectations for all pupils and educational equality throughout. Primary curricular from our feeder primary schools has been considered when developing our year 7 scheme of work.
- the concept of interrupting the forgetting process permeates the all-through mathematics long term plan (LTP) and schemes of work (SOW). Interleaving and spaced learning are utilised in several ways. Across each year, new learning is split into units of work, each beginning with quick revision, then focussing on extension and application of similar learning the year before. As a result, students will consistently revisit topics (spaced learning) and interleave concepts throughout their mathematics career. All lessons begin with a 'Do Now', which promotes recall of integral knowledge, along with applied practice, from topics in the previous unit of work, allowing for spaced practice of up to six weeks. In addition, each topic taught has a mini-test and consolidation or extension re-test attached to assess understanding. Staff mark all re-tests and gaps in learning are addressed through global feedback, with opportunity for targeted additional practice. These tests ensure learning is visited repeatedly. Spaced learning through retrieval practice and brain dumps in morning meetings and homework set through the Sparx system, are supplementary ways in which the forgetting process is interrupted, leading to true mastery of the mathematical curriculum.

The mathematics curriculum will address social disadvantage by addressing gaps in students' knowledge and skills:

- the spiral nature of the mathematics curriculum is designed with the most vulnerable student in mind, assuming a basic mathematical understanding from previous learning, each peak builds the students' knowledge. Key stage 3 in particular is used to ensure fluency in fundamental mathematics by closing any knowledge gaps evidenced in assessment, whilst also providing suitable extension.
- students in Y7 working below the nationally expected level are immediately targeted in interventions such as 'Morning Mastery' sessions. Priority is given to students recognised as disadvantaged and topics covered in these sessions are identified through baseline testing and KS2 SATS data. Throughout the year, attendance and topics covered in intervention sessions are altered according to

- mini-test scores, question level analysis from cycle assessments and in-class effective formative assessment. In order to meet the needs of all students, additional staff intervention tutors, are employed to deliver additional small group tutoring to address knowledge gaps. Again, priority is given to disadvantaged students for this additional intervention.
- students with special educational needs or disabilities have additional support. Double staffing is used where available to target this cohort to help close any gaps. Such students also receive further intervention through our intervention programme. All students access the same curriculum and we have the highest expectations of all. We teach to the top with scaffolding and support for those who need it in order to allow all students to achieve and experience the very best of what has been thought and said.

We fully believe mathematics can contribute to the personal development of students at Dixons Brooklands Academy:

- students will be encouraged to develop socially in mathematics lessons through the celebration of making mistakes and setting high expectations helps students to develop listening and speaking skills. Self-awareness is developed through self-assessment, which enables students to have an accurate understanding of their strengths and weaknesses, to accept them and the understand how to learn from them.
- developing morality is evident in much of the mathematics curriculum where there is reference to real life contexts and students are encouraged to make decisions thus developing an understanding that certain choices may have different consequences and outcomes. One example where this applies is in percentages where comparing interest rates occurs and the role of 'loan sharks' can be discussed. Additionally, topics such as tracking and how the media use misleading statistical diagrams are also addressed.
- encouraging students to question how mathematics impacts the way the world works promotes the spiritual growth of our students. Referring to 'big issues' such as the gender pay gap, birth and death rates, gambling through probability and global warming within contextual questions allows students to have a concrete understanding of where mathematics fits into the bigger picture. Teaching a variety of strategies that allow creativity to blossom (i.e. tessellation, construction and symmetry).
- being a universal language, and having phenomena developed all over the world, lends mathematics to promoting cultural capital. Discussion when introducing many topics, such as place value, time, Fibonacci sequences, Pythagoras and Trigonometry to name a few, allows cultural influences to be explored.

At KS3 and KS4, our belief is that homework should be interleaved-revision of powerful knowledge that has been modelled and taught in lessons. This knowledge is recalled and applied through a range of low-stakes quizzing and practice.

Opportunities are built in to make links to the world of work to enhance the careers, advice and guidance that students are exposed to:

- the mathematics curriculum provides students with opportunities to consider the world of work and how mathematics leads to successful careers. Each LI has a purpose attached for all students to see and, where relevant, the SoW refers to how the skill in question relates to specific careers or a future life context. For example, when teaching constructions, reference can be made to any form of design work or navigational career. Every unit of work also contains a careers spotlight where students are introduced to a variety of careers, which utilise the learning of the unit. Information about qualifications needed, salaries and career progression are also referenced. Additionally, custom displays have been made for the mathematics department indicating a large but not exhaustive list of the many careers mathematics lends itself to.

Y7 Mathematics

Long Term Plan 2023/2024

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations Spax	Unit 1 Algebra Algebraic notation	Unit 1 Algebra Substitution	Unit 1 Algebra Substitution	Unit 1 Algebra Simplifying	Unit 1 Algebra Simplifying	Unit 1 Algebra Solving	Unit 1 Algebra Solving	Unit 1 Algebra Sequences	Unit 1 Algebra Sequences	Unit 2 Number Place value, inequalities and ordering	Unit 2 Number Four operations Inc. decimals	Unit 2 Number Four operations Inc. decimals
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 2 Number Four operations Inc. decimals	Unit 2 Number Factors and multiples	Unit 2 Number Factors and multiples	Unit 2 Number Rounding and estimation	Unit 2 Number Rounding and estimation	Unit 2 Number Contextual Problem including Area and Perimeter	Unit 2 Number Contextual Problem including Area and Perimeter	Unit 3 Geometry Measures	Unit 3 Geometry Draw and Measure Angles	Unit 3 Geometry Properties of Triangles and Quadrilaterals	Unit 3 Geometry Properties of Triangles and Quadrilaterals	Unit 3 Geometry Angle Facts	Unit 3 Geometry Angle Facts
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	Unit 4 Fractions Fractions of	Unit 4 Fractions Equivalent Fractions	Unit 4 Fractions Four operations of Fractions	Unit 4 Fractions Four operations of Fractions	Unit 4 Fractions Order Fractions	Unit 4 Fractions Contextual	Unit 5 Percentages Percentage	Unit 5 Percentages FDP conversion	Unit 5 Percentages Percentage of Amounts	Unit 5 Percentages Percentages increase and decrease	Unit 5 Percentages Percentages increase and decrease	Unit 5 Percentages Simple Interest	



Y8 Mathematics

Long Term Plan 2023/2024

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations	Unit 6 – Probability and Statistics Probability of an event and frequency trees	Unit 6 – Probability and Statistics Probability of an event and frequency trees	Unit 6 – Probability and Statistics Outcomes	Unit 6 – Probability and Statistics Averages and Range	Unit 6 – Probability and Statistics Simple Statistical Diagrams	Unit 6 – Probability and Statistics Pie Charts	Unit 7 – Number Index Laws	Unit 7 – Number Using powers and roots - Pythagoras	Unit 7 – Number Standard Form	Unit 7 – Number Prime Factorisation – HCF/LCM	Unit 7 – Number Prime Factorisation – HCF/LCM	Unit 7 – Number Sets
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 8 - Algebra Inequalities	Unit 8 - Algebra Manipulating algebra	Unit 8 - Algebra Manipulating algebra	Unit 8 - Algebra Manipulating algebra	Unit 8 - Algebra Solving Equations	Unit 8 - Algebra Solving Equations	Unit 8 - Algebra Expanding and Factorising	Unit 8 - Algebra Expanding and Factorising/ Sequences	Unit 8 - Algebra Sequences	Unit 9 – 2D Geometry Constructions	Unit 9 – 2D Geometry Finding unknown angles	Unit 9 – 2D Geometry Finding unknown angles	Unit 9 – 2D Geometry Units
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	Unit 9 – 2D Geometry Area and composite shapes	Unit 9 – 2D Geometry Area and composite shapes	Unit 9 – 2D Geometry Circles	Unit 10 – Proportional Reasoning Percentage Increase and Decrease	Unit 10 – Proportional Reasoning Percentage Increase and Decrease	Unit 10 – Proportional Reasoning Reverse percentages	Unit 10 – Proportional Reasoning Interest Calculations	Unit 10 – Proportional Reasoning Percentage Increase and Decrease	Unit 10 – Proportional Reasoning Ratio	Unit 10 – Proportional Reasoning Ratio	Unit 10 – Proportional Reasoning Compound Measures	Unit 10 – Proportional Reasoning Compound Measures	

Y9 Mathematics

Long Term Plan 2023/2024

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations	Unit 11 – 3D Geometry Solids’ properties, nets, plans, elevations	Unit 11 – 3D Geometry Surface Area	Unit 11 – 3D Geometry Surface Area	Unit 11 – 3D Geometry Volume of a prism	Unit 11 – 3D Geometry Cylinders, Cones and Pyramids	Unit 11 – 3D Geometry Cylinders, Cones and Pyramids	Unit 11 – 3D Geometry Composite Shapes	Unit 12 – Statistics Collecting and Organising Data	Unit 12 – Statistics Collecting and Organising Data 2	Unit 12 – Statistics Interpreting and Comparing Data	Unit 12 – Statistics Averages and Range from Frequency Tables	Unit 12 – Statistics Frequency Polygons and Histograms
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 12 – Statistics Bias	Unit 13 – Graphs and Proportion Interpreting coordinates	Unit 13 – Graphs and Proportion Linear functions	Unit 13 – Graphs and Proportion Direct Proportion	Unit 13 – Graphs and Proportion Inverse Proportion	Unit 13 – Graphs and Proportion Scales	Unit 14 – Algebraic Expressions Sequences	Unit 14 – Algebraic Expressions Sequences	Unit 14 – Algebraic Expressions Expanding Polynomials	Unit 14 – Algebraic Expressions Factorising	Unit 14 – Algebraic Expressions Factorising	Unit 14 – Algebraic Expressions Solving Inequalities and Quadratic Equations	Unit 14 – Algebraic Expressions Solving Inequalities and Quadratic Equations
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	Unit 14 – Algebraic Expressions Transposing Formulae	Unit 15 – 2D Geometry Construction and Loci	Unit 15 – 2D Geometry Angle Facts	Unit 15 – 2D Geometry Angle Facts	Unit 15 – 2D Geometry Congruency	Unit 15 – 2D Geometry Similar Shapes	Unit 15 – 2D Geometry Arcs and Sectors	Unit 16 – Algebraic Graphs Inequalities	Unit 16 – Algebraic Graphs Simultaneous Equations	Unit 16 – Algebraic Graphs Simultaneous Equations	Unit 16 – Algebraic Graphs Quadratic Graphs	Unit 16 – Algebraic Graphs Other Graphs	

Y10F Mathematics

Long Term Plan 2023/2024

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations	Unit 17 Triangles and Transformations Pythagoras' theorem	Unit 17 Triangles and Transformations Pythagoras' theorem Inc. 3D	Unit 17 Triangles and Transformations Trigonometry	Unit 17 Triangles and Transformations Trigonometry	Unit 17 Triangles and Transformations Reflection, Translation and Rotation	Unit 17 Triangles and Transformations Enlargements	Unit 17 Triangles and Transformations Mixed Transformations	Unit 18 Statistics Averages from raw and grouped data, compare data sets	Unit 18 Statistics Representing Data	Unit 18 Statistics Statistical Diagrams	Unit 18 Statistics Frequency Polygons and comparing data	Unit 18 Statistics Scatter Graphs
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 19 Algebra and Graphs Co-ordinates	Unit 19 Algebra and Graphs $y = mx + c$	Unit 19 Algebra and Graphs $y = mx + c$	Unit 19 Algebra and Graphs Parallel Lines and Quadratic Graphs	Unit 20 Limits and 3D Geometry Rounding and Estimating	Unit 20 Limits and 3D Geometry Rounding and Estimating	Unit 20 Limits and 3D Geometry Congruency and Similar Shapes	Unit 20 Limits and 3D Geometry Plans and Elevations	Unit 20 Limits and 3D Geometry Area of 2d shapes	Unit 20 Limits and 3D Geometry Area of 2d shapes	Unit 20 Limits and 3D Geometry Circles	Unit 20 Limits and 3D Geometry Circles	Unit 20 Limits and 3D Geometry Surface Area
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	Unit 20 Limits and 3D Geometry Volume	Unit 20 Limits and 3D Geometry Volume	Unit 21 Probability Sampling, scales, single events, not happening, bias and sample space	Unit 21 Probability List outcomes, product rule, theoretical / experimental, expected frequency	Unit 21 Probability Independent events, probability of combined events (and/or rules), conditional events	Unit 21 Probability Venn Diagrams	Unit 22 Number Ordering integers, fractions, and decimals. Four operations (integers and decimals), working with money.	Unit 22 Number Indices and index laws (multiply, divide, brackets, basic negative)	Assessments	Unit 22 Number Standard Form	Unit 22 Number Factors, multiples, HCF and LCM, Prime factorisation (include HCF and LCM)	Unit 22 Number Four operations with fractions (Inc. simplifying and converting to mixed number)	

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations	Unit 17 Triangles and Transformations Pythagoras' theorem Inc. 3D	Unit 17 Triangles and Transformations Pythagoras' theorem Inc. 3D	Unit 17 Triangles and Transformations Trigonometry	Unit 17 Triangles and Transformations Trigonometry (Inc. graphs)	Unit 17 Triangles and Transformations Reflection, Translation and Rotation	Unit 17 Triangles and Transformations Enlargement, Inc. negative and fractional	Unit 17 Triangles and Transformations Mixed Transformations	Unit 18 Probability and Statistics Experimental probability and Probability of combined events	Unit 18 Probability and Statistics MMMMR from a frequency table	Unit 18 Probability and Statistics Cumulative frequency and box plots	Unit 18 Probability and Statistics Compound measures	Unit 18 Probability and Statistics Compound measures
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 19 Algebra Graphs Line segments	Unit 19 Algebra Graphs Equation of a line from coordinates	Unit 19 Algebra Graphs Parallel and perpendicular lines	Unit 19 Algebra Graphs Sketching quadratics Gradient of and area under curves	Unit 19 Algebra Graphs Sketching quadratics Gradient of and area under curves	Unit 20 Limits and 3D Geometry Rounding and Estimating	Unit 20 Limits and 3D Geometry Bounds of accuracy	Unit 20 Limits and 3D Geometry Bounds of accuracy	Unit 20 Limits and 3D Geometry Volume and S.A	Unit 20 Limits and 3D Geometry Volume and S.A	Unit 20 Limits and 3D Geometry Volume and S.A	Unit 20 Limits and 3D Geometry Plans and Elevations	Unit 20 Limits and 3D Geometry 3D Geometry Applications
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	Unit 21 Probability Outcomes Inc. product rule and sample space	Unit 21 Probability Understanding and using sampling	Unit 21 Probability Venn diagrams	Unit 21 Probability Probability of combined events	Unit 21 Probability Conditional probability	Unit 21 Probability Conditional probability	Unit 22 Number Index laws Inc. equations, fractional and negative	Unit 22 Number Standard form calculations	Assessments	Unit 22 Number Interest Inc. growth and decay	Unit 22 Number Surds	Unit 22 Number Surds	Unit 22 Number Surds

Y11F Mathematics

Long Term Plan 2023/2024

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations	Unit 5X Number Index Laws	Unit 5X Number Index Laws	Unit 5X Number HCF/LCM	Unit 5X Number Standard Form	Unit 5X Number % increase and decrease	Unit 5X Number Reverse %s	Unit 5X Number Compound Interest	Unit 5X Number Ratio	Unit 5X Number Ratio	Unit 5X Number Ratio	Unit 5X Number Compound Measures	Unit 6X Geometry Transformations
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 6X Geometry Transformations	Unit 6X Geometry Pythagoras	Unit 6X Geometry Trigonometry	Unit 6X Geometry Area and Volume	Unit 6X Geometry Area and Volume	Unit 7X Algebra Simplifying Expressions	Unit 7X Algebra Equations	Unit 7X Algebra Equations	Unit 7X Algebra Expand and Factorise	Unit 7X Algebra Expand and Factorise	Unit 7X Algebra Sequences	Unit 8X Angles Parallel Lines	Unit 8X Angles Polygons
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	REVISION Statistical Graphs	REVISION Probability	REVISION Exam Practice	REVISION Exam Practice	EXAMS	EXAMS	EXAMS	EXAMS	EXAMS				

Y11H Mathematics

Long Term Plan 2023/2024

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	28/8 Expectations	4/9	11/9	18/9	25/9	2/10	9/10	16/10	6/11 Re-induction	13/11	20/11 Planning days	27/11	4/12
	Expectations	Unit 5 Number Index Laws	Unit 5 Number Standard Form	Unit 5 Number Growth and Decay	Unit 5 Number Surds	Unit 5 Number Surds	Unit 5 Number Ratio	Unit 6 2D Geometry Trigonometry Graphs	Unit 6 2D Geometry Trigonometry Non-right angled triangles	Unit 6 2D Geometry Bearings	Unit 6 2D Geometry Loci	Unit 6 2D Geometry Vectors	Unit 6 2D Geometry Vectors
Cycle 2	11/12	18/12	8/1 Re-induction	15/1	22/1	29/1	5/2 Trust Day	19/2 Re-induction	26/2	4/3 Planning Days	11/3	18/3	8/4 Re-induction
	Unit 7 Harder Algebra Algebraic Fractions	Unit 7 Harder Algebra Algebraic Fractions	Unit 7 Harder Algebra Solving Quadratics	Unit 7 Harder Algebra Solving Quadratics	Unit 7 Harder Algebra Quadratic Graphs	Unit 7 Harder Algebra Non-linear simultaneous equations	Unit 8 Number & Algebra Iteration	Unit 8 Number & Algebra Graphing Proportion	Unit 8 Number & Algebra Graphing Proportion	Unit 8 Number & Algebra Circle Theorems	Unit 8 Number & Algebra Circle Functions and Tangents	Unit 8 Number & Algebra Quadratic nth term	Unit 8 Number & Algebra Transformation of functions
Cycle 3	15/4	22/4	29/4	6/5 BH MON	13/5	20/5	3/6 Re-induction	10/6	17/6	24/6	1/7	8/7	15/7 Planning Days
	Unit 8 Number & Algebra Quadratic Inequalities	Unit 8 Number & Algebra Algebraic and geometric proof	Unit 8 Number & Algebra Functions	REVISION	REVISION	EXAMS	EXAMS	EXAMS	EXAMS				