Mathematics Ethos and Teaching

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Intent:

The mathematics department at Kilgarth believes maths is a way of communicating. It is a language through which ideas can be explained, explored and developed, and one through which relationships can be expressed, hypothesis made and tested and patterns identified. At all key stages, the intent is to provide a motivating and engaging context in which pupils can achieve and make progress based on their assessed levels, developing and taking their next steps in a personalised way.

The following form the foundation of all delivery:
- communication and understanding
- personal and social development
- independence
- engagement and enjoyment

Our maths lessons, whilst incentivising pupils to engage in the curriculum and display expected behaviours, also serves to encourage pupils to step outside their comfort zones and gain in confidence as they embrace new experiences; often ones that they thought inaccessible to them. Our vision within the mathematics department is to give students the mathematical and numerical skills with which they can thrive academically and function successfully in their home community and working environment. The mathematics department intends to ensure that all pupils gain fluency in mathematical reasoning and problem solving. Our curriculum is designed to ensure that pupils receive a high quality mathematical education that is tailored to develop the skills the learners will require to develop mathematical application and resilience, and to have a sense of enjoyment and curiosity about the subject.

Implementation

The mathematics department implements this through a carefully planned curriculum based on a five-year progression model in Key Stages 3 and 4; the mathematics National Curriculum is fully covered in Key Stage 3 to a depth appropriate to each individual. Pupils at Key Stage 3 follow the National Curriculum Programme of Study and their progress is assessed continually as they complete the topics. The school has adopted the Collins 'New Maths Framework' as its scheme of work in Key Stage 3. In addition to this, AQA Entry Level Certificate in Mathematics is also offered before the transition into Key Stage 4. Pupils at Key Stage 4 follow the Edexcel GCSE (9-1) Mathematics specification. There are now three papers, one non-calculator paper and two calculator papers. The mathematics department is trialling a new Functional Skills Mathematics up to Level 2 qualification this academic year as an alternative pathway to GCSE maths, this is intended to offer a more practical and vocationally sympathetic pathway.

Lessons are planned building on previous knowledge and skills gained by pupils. Teachers are then supported by each other to deliver high quality lessons where learning is embedded and sequential to facilitate long term retention. Pupils who succeed quickly are challenged by rich and analytical problems before being moved on to new concepts. Pupils who are less mathematically fluent are supported with extra teaching support and additional intervention where appropriate. Regular assessments of knowledge, skills and application identifies priorities for intervention and future delivery, and also encourage pupils to reflect on their progress. We have a designated Numeracy Coordinator who supports other curriculum areas with their teaching of mathematical concepts. The whole school literacy policy of incorporating the key vocabulary as identified on the curriculum is upheld and pupils are encouraged to use appropriate language.

Implementation Curriculum of Study:

Key Stage 3 – Pupils' follow the national curriculum programme of study in years 7&8.

	Autumn	Spring	Summer
Year 7	**Autumn 1:** • **Number** - Pupils will learn about calendar and time, fractions and decimals. • **Algebra** - Pupils will learn about sequences, patterns and rules. • **Geometry and measures** - Pupils will learn about perimeter, area and surface area. **Autumn 2:** • **Statistics** - Pupils will learn about mode, range and probability. • **Geometry and measures** - Pupils will learn about angles, acute, obtuse, reflex and straight line. • **Statistics** - Pupils will learn how to data collect, using tally charts and grouped frequencies.	**Spring 1:** • **Number** - Pupils will learn about the four operations, BIDMAS, multiplication and division and calculating with measurements. • **Algebra** - Pupils will learn about square and triangle numbers, coordinates and naming graphs. **Spring 2:** • **Geometry and measures** - Pupils will learn how to measure and draw angles, constructions and be able to solve geometrical problems. • **Number** - Pupils will work on percentages, ratio and proportion and solve problems using these methods.	**Summer 1:** • **Geometry and measures** - Pupils will learn about reflections, rotations, translations and rotational symmetry. • **Statistics** - Pupils will learn about pie charts, two way tables and statistical surveys. **Summer 2:** • **Number** - Pupils will learn about decimals; adding, subtracting, multiplying and dividing, factors and solving problems. • **Geometry and measures** - Pupils will learn about polygons, tessellations and constructing 3-D shapes.
Year 8	**Autumn 1:** • **Number and algebra** - Pupils will learn about HCF, LCM, square numbers and roots, prime factors and sequences and rules. • **Geometry and measures** - Pupils will learn about angles, properties of a quadrilateral, parallel and perpendicular lines and construction. • **Statistics** - Pupils will learn about probability and experimental probability and be able to collect data for a frequency table. **Autumn 2:** • **Number** - Pupils will learn about fractions and decimals with the four operations and	**Spring 1:** • **Algebra** - Pupils will learn about functions from inputs and outputs, graphs from functions and distance time graphs. • **Number** - Pupils will learn about powers of 10, adding and subtracting decimals and long multiplication and division. • **Geometry and measures** - Pupils will learn about shape and ration, congruent shapes and reflections and transformations. **Spring 2:** • **Algebra** - Pupils will learn about puzzle mappings and substituting into expressions or formulae.	**Summer 1:** • **Number** - Pupils will learn about adding, subtracting, multiplying and dividing decimals, fractions and order of operations. • **Algebra** - Pupils will learn how to construct equations to solve problems, expand brackets and understand real life graphs. • **Solving problems** - Pupils will use words and diagrams to solve problems and learn about proportion and ratio. **Summer 2:** • **Geometry and measures** - Pupils will

learn about percentage increase and decrease. • **Algebra** - Pupils will learn about algebra, the rules in algebra and be able to expand brackets. • **Geometry and measures** - Pupils will learn about perimeter and area of rectangles, compound shapes and learn about surface area of cubes and cuboids.	• **Statistics** - Pupils will learn about charts including bar, pie and understand information from different diagrams.	learn about plans and elevations, bearings, constructing triangles and scale drawings. • **Statistics** - Pupils will learn about frequency tables, comparing data and experimental and theoretical problems.

Key Stage 4 and Year 9 pupils

Key Stage 4 and year 9 pupils will study Edexcel GCSE Mathematics over a 3 year course. Additionally during year 9 a lesson per week will be put aside during the Autumn Term and Spring 1 Term for pupils to complete AQA Entry Level Certificate in Mathematics.

AQA Entry Level Mathematics (5930)							
Eight internally set modules (externally moderated).							
1.Property of number	2. Four operations	3. Ratio	4. Money	5. The calendar and time	6. Measure	7. Geometry	8. Statistics
30marks	**30marks**	**30marks**	**30marks**	**30marks**	**30marks**	**30marks**	**30marks**
Total Marks 240							
Entry Level 3 – 185 Marks **Entry Level 2 – 121 Marks** **Entry Level 1 – 57 Marks**							

Edexcel GCSE Mathematics (9-1)

Edexcel GCSE Mathematics (9-1) External Examination		
Paper 1 **Non-Calculator**	**Paper 2** **Calculator**	**Paper 3** **Calculator**
1hr 30mins Marks 80	1hr 30mins Marks 80	1hr 30mins Marks 80
33⅓ %	33⅓ %	33⅓ %

Edexcel GCSE Mathematics (9-1) Progression Route			
	Autumn	**Spring**	**Summer**
Year 9	**Autumn 1:** • **Number 1 -** Pupils will learn about calculations, decimal numbers, place value, factors and multiples, squares, cubes and roots, index notation, prime factors and problem solving. There will be opportunities to strengthen, extend and have a unit test. • **Algebra 1 -** Pupils will learn about algebraic expressions, simplifying, substitution, formulae, expanding brackets, factorising and using expressions and formulae. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. **Autumn 2:** • **Statistics 1 - Graphs, tables and charts -** Pupils will learn about frequency tables, two way tables, representing data, time series, stem and leaf diagrams, pie charts, scatter graphs and lines of best fit. Problem solving will be tested and again there	**Spring 1:** • **Algebra 2 - Equations, inequalities and sequences -** Pupils will learn how to solve equations, solve equations with brackets, generate sequences, use formulae and be introduced to inequalities. They will also learn about the nth term of a sequence. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. **Spring 2:** • **Geometry and Measure 1 - Angles** - Pupils will learn about properties of shape, angles in parallel lines, angles in triangles, exterior and interior angles and geometrical problems. Problem solving will be	**Summer 1:** • **Statistics 2 - Averages and range** - Pupils will learn about mean and range, mode medium, types of averages, estimating the mean and sampling. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. **Summer 2:** • **Geometry and Measure 2 - Perimeter, area and volume** - Pupils will learn about rectangles, parallelograms and triangles, trapezia and changing units. Area of compound shapes, surface area of 3D solids and volume of prisms. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.

	will be opportunities to strengthen, extend and have a unit test. • **Number 2 - Fractions and percentages -** Pupils will learn about working with fractions, operations with fractions, multiplying and dividing fractions, fractions and decimals, percentages and calculating percentages. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.	tested and again there will be opportunities to strengthen, extend and have a unit test.	
Year 10	**Autumn 1:** • **Algebra 3 - Graphs:** Pupils will learn about coordinates, linear graphs, gradient, $y = mx + c$, real - life graphs and distance - time graphs. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. • **Geometry and Measure 3 - Transformations:** Pupils will learn about translation, reflection, rotation, enlargement, describing enlargements and combining transformations. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test **Autumn 2:** • **Geometry and Measure 4 - Ratio and proportion:** Pupils will learn how to write and use ratios and measures, compare ratios, use proportion and graphs and solve proportion	**Spring 1:** • **Geometry and Measure 4 - Right - angled triangles:** Pupils will learn about Pythagoras Theorem, trigonometry; the sine ratio 1 and 2, the cosine ratio and the tangent ratio. Pupils will also learn how to find lengths and angles using trigonometry. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. • **Statistics 3 - Probability:** Pupils will learn how to calculate probability, experiment with probability and learn about venn and tree diagrams. Problem solving will be tested and again there will be opportunities to	**Summer 1:** • **Geometry and Measure 6 - Construction, loci and bearings:** Pupils will learn about 3D solids, plans and elevations, accurate drawings, scale drawings and maps, constructions, loci and regions and bearings. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. • **Algebra 4 - Quadratic equations and graphs:** Pupils will learn how to expand double brackets, plot and use quadratic graphs, factorise quadratic expressions and solve quadratic equations algebraically. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. **Summer 2:** • **Geometry and Measure 7 - Perimeter, area and volume 2:** Pupils will learn how to measure the

	problems. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.	strengthen, extend and have a unit test. **Spring 2:** • **Geometry and Measure 5 - Multiplicative reasoning:** Pupils will learn growth and decay, compound measures, distance, speed and time and direct and inverse proportion. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.	circumference of a circle, the area of a circle. Pupils will learn about semicircles and sectors, composite 2D shapes and cylinders, pyramids and cones, spheres and composite solids. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.
Year 11	**Autumn 1:** • **Number 3 - Fractions, indices and standard form:** Pupils will revisit work on how to multiply and divide fractions, learn about the laws of indices, write large numbers in standard form, write small numbers in standard form and calculate with standard form. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test. • **Geometry and Measure 8 - Congruence, similarity and vectors:** Pupils will learn about similarity and enlargement, using similarity, congruence and vectors. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.	**Spring 1:** • **Revision – Topic based revision:** Pupils will practice exam style questions both short and long. Pupils will learn to break questions down according to the mark scheme. Pupils will identify their strengths and weaknesses. **Spring 2:** • **Revision – Exam Paper Format revision:** Pupils will practice exam style questions both short and long in past paper order. Pupils will learn to break questions down according to the mark scheme. Pupils will identify their strengths and weaknesses. Pupils will identify timings on approaching questions.	**Summer 2:** • **Revision – Exam Paper Format revision:** Pupils will practice exam style questions both short and long in past paper order. Pupils will learn to break questions down according to the mark scheme. Pupils will identify their strengths and weaknesses. Pupils will identify timings on approaching questions. Pupils will learn exam techniques.

	Autumn 2: • **Algebra 5 - More algebra:** Pupils will learn about graphs with cubic and reciprocal functions, non-linear graphs. Pupils will learn how to solve simultaneous equations algebraically, rearrange formula and learn about proof. Problem solving will be tested and again there will be opportunities to strengthen, extend and have a unit test.	Pupils will learn exam techniques.	

Impact

The aspiration for all pupils who attend the Kilgarth School is they achieve their potential in all aspects of their development. All pupils who attend Kilgarth School have additional needs which are supported by an EHCP. We work in a determined way, going the extra mile, to ensure that all pupils can achieve the most they can. Our aim is to develop pupils' confidence and proficiency with numbers and measures. Pupils are taught that successful mathematicians require an understanding of the number system, and ability to solve number problems in a variety of contexts. They learn that numeracy also demands practical understanding. They develop ways in which information is gathered by counting and measuring, and how that this can be presented in graphs, diagrams, charts and tables. To support the development and acquisition of mathematical skills, the department continually seeks to provide a range of practical activities through which pupils' understanding of the subject can be enhanced.

The outcome of the curriculum is highly individual. All achievement and progress is celebrated. Progress for our pupils can be demonstrated by:
- Pupils making progress towards/achieving their intended outcomes set with parents/carers for 12 months within the EHCP annual meetings. These outcomes are informed by any relevant professionals working with the pupils.
- Pupils making progress towards outcomes when reviewed in 6-month review meetings with parents/carers, progress days.
- Pupils making progress/achieving in the curriculum planned by teachers. Progress and achievement in maths are highlighted within reports to parents termly and shown on their individual flightpath record.
- Achieving external accreditation for secondary aged pupils e.g. Edexcel accreditation at GCSE. Using existing skills in a wider range of contexts.

In essence our Mathematics Department is designed to be progressive, functional and stimulating. We endeavour to move progressively with the ever changing world around us and give our pupils the right toolkit to access this world they will enter. This will be functional and pupil-centred to their own individual pathways, preparing them for their post 16 learning route.