The Lloyd Williamson Schools Foundation

Mathematics Policy

General Statement

We believe Mathematics is:

- an essential element of communication which is important to analyse and communicate information and ideas
- an important tool which can be used to facilitate the solving of a variety of numerical problems and which should equip the children for adult life
- one way of teaching flexibility, initiative, accuracy, systematic logical thinking and is a source of interest and fun.

Mathematics education should provide a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics and a sense of enjoyment and curiosity about the subject.

Aims and Objectives

At The Lloyd Williamson Schools we aim to:

- implement agreed programmes of study, designated to each class
- to ensure that each child will leave our school numerate and able to use and apply mathematics with confidence and to the best of their personal ability
- pass on knowledge
- to teach skills
- to develop understanding

We believe all pupils should:

- become fluent in the fundamentals of mathematics
- be able to apply their knowledge and conceptual understanding rapidly and accurately
- be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, developing an argument, justification or proof using mathematical language
- learn to solve problems by applying their skills to a range of problems with increasing complexity across the curriculum

Approaches to Teaching and Learning

Curriculum

We use the National Curriculum as a guide and offer extension topics and activities beyond the parameters of this.

Planning

We operate a planning procedure agreed by the whole teaching staff, based upon the programmes of study developed in negotiation with the Co-Principals. We develop termly plans which give details

of appropriate activities and outcomes and resources. The use and application of Mathematics to investigate and solve problems is integrated with work on number, algebra, shape, space, and handling data to ensure that we help the children to think mathematically. In the Early Years Foundation Stage (Nursery and Sprites) the early years curriculum is founded on the principles and practice laid out in the EYFS guidelines.

At the Lloyd Williamson Schools, all teaching staff will:

1. Organise and maintain Mathematics teaching resources
2. Implement agreed schemes of work and programmes of study
3. Coordinate recording and presentation of the children's work and their own summative assessments
4. Advise the Co-Principal of action required pertaining to resources and standards etc
5. Encourage ways of involving parents in their children's learning and promote liaison between school and home
6. Provide support to LSAs who work on mathematics with their children and so improve the quality and continuity of mathematics teaching and learning throughout the school for all pupils

The expectation is that all pupils should and will progress through the mathematics programmes of study at broadly the same pace. Decisions about when to move on will be based on readiness. Pupils who grasp concepts quickly will be challenged by being offered rich and significant reinforcement work before being accelerated through new content.

ICT in Mathematics

Calculators will not be used in place of good written and mental arithmetic skills. They will be introduced at a later stage in Key Stage 2 to support pupils' conceptual understanding and exploration of more complex number problems - only when written and mental arithmetic skills are secure. Teachers will use their judgement about when ICT tools will be used.

Teaching Styles and Strategies

A range of styles of teaching is necessary for the teaching of Mathematics. Approaches need to be related to the topic itself and to the abilities and experience of both teachers and pupils.

Our teaching at all levels will include opportunities for:

- teacher exposition
- discussion techniques (pupil/pupil and pupil/teacher) and appropriate practical work
- consolidation and practice of fundamental skills and routines
- problem solving
- the committing to memory and recall of a range of mathematical facts
- investigation work
- classwork, group work and individual work

Equal Opportunities

The teaching of Mathematics will be in accordance with the schools' ethos with regard to equal opportunities. We aim to provide equal access to mathematics for those children with Special Educational Needs and those pupils who are very able and require extension activities, through small group work and through the use of Classroom LSAs' help where appropriate and available.

Through our teaching of Mathematics we provide learning opportunities that enable all pupils to make progress. We do this by setting suitable learning challenges and responding to each child's different needs. Our assessment of those needs takes in a range of factors: classroom organisation, teaching materials, teaching style, differentiation, to enable each child to learn more effectively.

Some children require an Individual Education Plan (IEP). The IEP may include, as appropriate, specific targets relating to Mathematics.

Assessment, Recording and Reporting

Children's work will be marked according to the agreed school policy and performance continually assessed in accordance with the standards agreed by the Schools' Co-Principals and the class teacher. The teacher may also test/quiz children from time to time, as may the Principal. The teacher will pass on relevant information to other teachers and the children will receive constructive comments about their work from each appropriate teacher. Results of quizzes are used to inform staff about planning for each child's needs. Teachers meet regularly with parents if necessary, and the School holds an annual Parent/Teacher Consultation Evening in the Spring Term. Formal written reports are given to parents in the Autumn and Summer Terms. Children from Pegasus upwards will assessed annually in the Summer Term using the Progress in Maths test (GL Assessment).

Monitoring and Evaluation

The monitoring and evaluation of the Mathematics policy is the responsibility of the Co-Principal who is responsible for the development of numeracy throughout the school. This is to be achieved in a variety of ways:

- regular discussions with staff concerning progress of classes, groups and individuals
- involvement in long and medium term planning across the school in Mathematics
- regular classroom observation and working alongside colleagues to help identify strengths and weaknesses and to provide support to individual staff as appropriate
- regular monitoring of resources
- reviewing of assessment outcomes to evaluate the quality of learning in Mathematics throughout the school
- checking that within a key stage there is coverage of the full Mathematics curriculum as per The Lloyd Williamson Schools: Mathematics Policy and Programmes of Study
- checking that appropriate opportunities to raise multicultural and gender issues are created and taken in the production of worksheets and other resources
- ensuring that adequate time is spent on the teaching of Mathematics in each class

Resources

Teachers use the *Schofield and Sims, Bond Books and older children move onto CGP books* – all at differing rates and individual pace -- in addition to a variety of other maths resources appropriate to age and ability (IXL). Library resources are held centrally. Teachers use a variety of school-based resources and their own personal resources.

**NOTE ABOUT BELOW PROGRAMMES OF STUDY:

Although this information is set out in year groups and classes, this does not reflect the professional judgment of the teacher to differentiate the material according to individual children's skills and abilities. Some children will be placed into high flying groups. This curriculum takes into account that the children will be working above their national curriculum cohort.

Updated: September 2023
Next review: August 2024

Lucy Meyer
Principal

Programmes of Study

The following is an agreed topic based Programme of Study for each year group in the Schools.

Early Years:

Sprites follow the Early Years Foundation Stage guidelines. Where appropriate developmentally, children should also learn about:

NUMBER

- Number lines
- Counting up to and back from 10
- Continued counting appropriate to the ability of individual children
- Ordering and writing numbers 0 - >10
- Division of objects into sets
- Completion of sets e.g. 2 dot x3 makes 6 dots
- Ordinal numbers
- More and less than
- Numbers before and after
- Same and Different
- Matching objects and numbers
- Simple fractions – whole, half, quarter – demonstrated experientially
- Halving numbers / pairs
- Number words
- Understanding zero
- Recognition and understanding of mathematical signs (- +=)
- Addition to 10
- Reading and writing numbers
- Subtraction within 10
- Addition and subtraction story problems
- Many and few
- Number machines

- Money and use of coins up to 20p
- Recognition of coins to £2.00
- Addition and subtraction of money (simple and ability led)
- Introduction of change
- Counting to 100
- Number squares
- Number patterns
- Sequences
- Mathematical terminology: add, take-away, subtract, equals, total

SHAPE AND SPACE

- Differentiate between curved and straight lines – on their own, in shapes and in real life
- Identify the properties and differences between simple shapes: circles, squares, rectangles, triangles, ovals and hearts
- Identify shapes in the world around
- Positional words: left, right, above, below, behind, under, inside, outside, on, next to, middle, between, top and bottom
- Comparative sizes: largest, smallest etc
- Comparative places: first, next last etc
- Sequencing events
- Open and closed shapes

HANDLING DATA

- Sorting and matching by colour, shape, visual and functional differences
- Identifying and completing patterns
- Basic Venn diagrams
- Basic bar graphs
- Estimation

MEASUREMENT

- Time: day and night
- Passing of time: longer and shorter tasks
- Time of day
- Understanding how we measure time: clocks and watches
- O'clock times: digital and analogue
- Half past: digital and analogue
- Days of the week
- Months
- Comparison: of length, height, size and weight
- Units of measurement
- Introduction of centimetres
- Using scales
- Introduction to kilograms

Key Stage 1

Pegasus:

NUMBER

- Revision of previous knowledge and understanding
- Counting to, and back from 50 – then up to 100
- Place value up to hundred
- Addition bonds to 10
- Counting on and counting back
- More than/less than
- Number lines up to 100
- Subtraction of numbers less than 20
- Multiplication by 2,5 and 10
- Division by 2,5 and 10
- Odd and even numbers up to 100
- Square additions
- Horizon and vertical additions: Tens and unit columns
- Additions of more than 9, carrying over the extra ten
- Using a 100 square

SHAPE AND SPACE

- Revision of previous knowledge and understanding
- Properties of 2D shapes: triangle, square, pentagon, hexagon and octagon.
- 3-D shapes: cube, cuboids, cylinder and cones.

HANDLING DATA

- Revision of previous knowledge and understanding
- Reading graphs
- Bar graphs
- Pictograms
- Venn diagrams
- Estimation
- Sorting and matching by colour, shape, visual and functional differences
- Identifying and completing patterns

MEASUREMENT

- Revision of previous knowledge and understanding
- Ordinal numbers
- Days and months
- O'clock, half past, quarter to and quarter past
- Digital and analogue times
- Right angles
- Length- measuring cm, mm, m and km.
- Height and width

Dragons:

NUMBER

- Revision of previous knowledge and understanding
- Separation of numbers into digits
- Reading 2 and 3 digit numbers
- Place value up to thousands then tens/hundreds of thousands
- Writing numbers in words up to hundreds of thousands
- Ordering numbers by size
- Understanding zero as a place value
- Addition of 2 and 3 digit numbers (without carrying)
- Conversion of units to tens and tens to hundreds
- Addition of 2 and 3 digit numbers (with carrying)
- Subtraction of 2 and 3 digit numbers (without conversion)
- Subtraction of 2 and 3 digit numbers with conversion and borrowing
- Missing numbers addition and subtraction problems
- Understanding of mathematical terminology: total, sum of and difference
- Rounding numbers to the nearest 10 and 100
- Simple number patterns
- Revision and consolidation of 2, 5 and 10 times tables
- Division by 2, 5 and 10

- Odd and even numbers
- Multiplication by 3 and 4
- Division by 3 and 4
- Missing number problems in multiplication and division
- Mental arithmetic skills using the four rules of number
- Mental Arithmetic (Schofield and Sims – expectation of being on the introductory book/book 1)

SHAPE AND SPACE

- Revision of previous knowledge and understanding
- Properties of shapes: revision of all basic shapes, plus: hexagon, pentagon and octagon
- 3D shapes: cube, cuboid, cylinder and cone
- Mirror symmetry

HANDLING DATA

- Revision of previous knowledge and understanding
- Reading tables
- Bar charts
- Pictograms
- Venn diagrams

MEASUREMENT

- Revision of previous knowledge and understanding
- Months: order and number of days in each
- Seasons: which months belong
- Time facts: seconds, minutes, hours, days weeks etc
- O' clock, half past, quarter past and quarter to (digital and analogue)
- Intervals of 5 minutes (digital and analogue)
- Clockwise and anti-clockwise
- Right angles
- Weight: grams and kilograms
- Weight facts: 1000g = 1kg
- Conversion between grams and kilograms
- Length: mm, cm, m, km
- Plotting coordinates

Key Stage 2

Unicorns:

NUMBER

- Revision of previous knowledge and understanding
- Place value up to tens of thousands
- Revision of 2, 5, 10, 3, 4 times tables and memorisation of 6, 7, 8, 9, 11 and 12 times tables
- Multiplication of up to tens of thousands by units up to 9
- Revision of addition up to tens of thousands
- Subtraction (without and with conversion) up to tens of thousands
- Inverse operations: +/- x/÷

- Fractions: mixed numbers, equivalent
- Fractions of numbers
- Division of numbers up to tens of thousands by units up to 9
- Division with remainders
- Mental arithmetic skills using the four rules of number
- Mental Arithmetic (Schofield and Sims – expectation of being on book 1/2)

SHAPE AND SPACE

- Revision of previous understanding and knowledge
- Comparison of properties of 2D shapes
- Simple 3D shapes: cube, cuboid, cone and sphere
- Mirror symmetry

HANDLING DATA

- Revision of previous knowledge and understanding
- Tallying
- Frequency tables
- Vertical and horizontal bar charts

MEASUREMENT

- Revision of previous knowledge and understanding
- Units of length and conversion between: mm, cm, m, km
- Units of weight (mass), measurement and conversion between: mg, g, kg
- Units of volume (liquid), measurement and conversion between: ml and litres
- Drawing of shapes accurately using given measurements

Griffins:

NUMBER

- Revision of previous knowledge and understanding
- Place value up to hundreds of thousands
- Multiplication and division of numbers up to hundreds of thousands by 10, 100 and 1000
- Addition and subtraction using a variety of strategies and methods of numbers to hundreds of thousands
- Multiplication and subtraction up to hundreds of thousands by units up to 9

- Multiplication of 3 digit numbers by 2 digit numbers
- Four rules of number using money and coins
- Prime numbers
- Revision of all times tables
- Square numbers
- Square roots of whole numbers
- Function machines
- Mental addition and subtraction of two numbers up to 99
- Mental Arithmetic skills using the four rules of number
- Mental Arithmetic skills (expectation of being on book 2/3)

SHAPE AND SPACE

- Revision of previous knowledge and shape
- Properties of 3D shapes: cylinder, cube, cuboid, sphere, cone, square-based pyramid, triangular-based prism and regular tetrahedron
- Faces, edges and vertices
- Shape: nets of cube, cuboid, square-based pyramid and triangular-based prism
- Symmetry

HANDLING DATA

- Revision of previous knowledge and understanding
- Venn diagrams
- Surveys
- Choosing types of graph by subject of survey/data
- Using collected information and presenting data in a variety of graphs

MEASUREMENT

- Revision of previous knowledge and understanding
- Temperature: positive and negative readings
- 24 hour clock
- Time: minutes and seconds
- Using clocks and stopwatches
- Time problems
- Reading simple scales
- Pictograms – with each picture worth more than the value of one
- Units of measure problems using the four rules

Minotaurs:

NUMBER

- Revision of previous knowledge and understanding
- Place value up to millions
- Number problems using the four rules up to millions
- Decimals as fractions

- Ordering decimals
- Four rules of number work pertaining to decimals
- Rounding numbers: using whole numbers and decimals
- Using calculators
- Converting decimals to fractions
- Converting fractions to decimals
- Comparing fractions
- Percentages: simple and complex
- Converting percentages into fractions and decimals
- Converting fractions into percentages
- Mathematical terminology
- Long multiplication
- Revision of square numbers
- Cube numbers
- Algebra as missing numbers/values 2x =10 x=5
- Mental arithmetic skills using the four rules of number
- Mental Arithmetic (Schofield and Sims – expectation of being on book 3/4)

SHAPE AND SPACE

- Revision of previous knowledge and understanding
- Properties of 2D shapes: square, rectangle, rhombus, trapezium, parallelogram and kite
- Triangles: equilateral, isosceles, right-angled and scalene
- Polygons: regular and irregular
- Perimeter
- Area of 3 and regular 4 sided shapes
- Circles: diameter and radius
- Congruence
- Line symmetry
- Rotational symmetry
- Plane symmetry
- Volume

HANDLING DATA

- Revision of previous knowledge and understanding
- Averages: mean, median, mode and range
- Pie diagrams
- Distance tables
- Probability
- Interpretation of graphs
- Plotting line graphs

MEASUREMENT

- Revision of previous knowledge and understanding
- Angles: right, acute, obtuse, reflex
- Measuring angles using a protractor
- Angles on a straight line
- Analogue and digital time problems using single minutes e.g 4.37 – 5.05: how many minutes

- Timetables: reading and problems
- Reading a variety of scales between whole numbers
- Map references
- Constructing triangles using a compass and protractor

Centaurs:

NUMBER

- Revision of previous knowledge and understanding
- Place value of to tend of millions
- Number problems up to tens of millions using the four rules of number
- Revision of long multiplication
- Long division
- Triangular numbers
- Number sequences inc. Fibonacci sequence
- Square roots
- Estimations of square roots
- Square roots using a calculator
- Sequencing using the 'nth' term
- Mental arithmetic skills using the four rules of number
- Mental Arithmetic (Schofield and Sims – expectation of being on book 4/5)
- Preparation for Entrance Examinations at 11+
- Algebra: simple linear equations

SHAPE AND SPACE

- Revision of previous knowledge and understanding
- Circles
- Circumference of circles
- Calculating the area of a circle
- Reflection, translation and rotation of shapes

HANDLING DATA

- Revision of previous knowledge and understanding
- Conversion graphs
- Methods of handling data
- Ensuring fairness of surveys and methods of testing

MEASUREMENT

- Revision of previous knowledge and understanding
- Imperial measurements and simple estimates of conversion to metric
- Time problems using the four rules of number

Key Stage 3

Chalkers

NUMBER

- Revision of previous knowledge and understanding
- Place value up to billions
- Working with whole numbers using the four rules
- Sequences
- Positive and negative
- Using the memory key on a calculator
- BODMAS
- Factors and multiples: odd and even, power of numbers,
- Squares and square roots
- Cubes and cube roots
- Prime numbers and prime factors
- Lowest common multiples
- Fractions: equivalent, reducing to the lowest terms, comparing, addition, subtraction, multiplication and division of, sequences, problems and square root of
- The decimal System: place value, necessary and unnecessary zeros, adding, subtracting, multiplying, dividing, links with fractions and vice versa, problems, estimation, decimal places and rounding off, accuracy of decimal calculations
- Percentages
- Wages and salaries
- Simple Interest
- Household finance
- Algebra: linear and simultaneous equations
- Mental arithmetic skills using the four rules of number
- Mental Arithmetic (Schofield and Sims – expectation of being on book 5/6)

MEASUREMENT

- Revision of previous knowledge and understanding
- Length,
- Weight,
- Capacity,
- Conversion of metric and imperial units,
- Estimating measures,
- Money
- Ratio and proportion
- Time, Distance, Speed

SHAPE AND SPACE

- Revision of previous knowledge and understanding
- Angles and straight lines
- Symmetry
- Plane figures
- Perimeters and Areas
- Solid figures
- Maps, bearings and scale drawings
- Transformations and tessellations

HANDLING DATA

- Revision of previous knowledge and understanding
- Graphs
- Simple statistics

Hydras (LOWER & UPPER)

Cambridge IGCSE Programme of Study