Laurel Avenue
Community Primary School

Curriculum Statement for Mathematics
Intent, Implementation and Impact

At Laurel Avenue Community Primary School we define learning as a change to long term memory. Our aims are to ensure that our pupils experience a wide breadth of study and have, by the end of each key stage, long-term memory of an ambitious body of procedural and semantic knowledge, that will support them in later life.

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides 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.

Our curriculum includes 'Threshold Concepts' (the ideas that shape pupils' thinking), taken from Chris Quigley's 'Essentials Curriculum' in each subject to track pupils' learning through the Milestones.

Each Threshold Concept is explored within different contexts so that it has tangibility and meaning. Breadth of contexts ensures that children gain relevant knowledge and can transfer this knowledge.

Our Aims – The Essential Characteristics of Mathematics Curriculum

We aim to ensure that all pupils gain:

An understanding of the important concepts and an ability to make connections within mathematics.

A broad range of skills in using and applying mathematics.

Fluent knowledge and recall of number facts and the number system.

The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.

The ability to think independently and to persevere when faced with challenges, showing a confidence of success.

The ability to embrace the value of learning from mistakes and false starts.

The ability to reason, generalise and make sense of solutions.

Fluency in performing written and mental calculations and mathematical techniques.

A wide range of mathematical vocabulary.

A commitment to and passion for the subject.

Aims of the National curriculum

The national curriculum for mathematics aims to ensure that all pupils:

> *become **fluent** in the fundamentals of mathematics, including 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.*
>
> ***reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language*
>
> *can **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. '*

(National Curriculum July 2014)

Entitlement

All pupils of Laurel Avenue Community Primary School are entitled to a Mathematical education which is;

- *adequately and appropriately resourced*
- *engages them in practical tests, real life situations and problem solving*
- *gives them the opportunity to practise and consolidate their knowledge*
- *promotes and strives for mastery.*

Curriculum Intent

Our Curriculum is underpinned by our core values and the three drivers. We use both the EYFS framework and the National Curriculum to shape the content and expectations of our curriculum. The Chris Quigley Essentials curriculum is used to help us structure this in each year group and look at progress within each phase. We have structured this so that each year group has:

a) A clear list of what must be covered.

b) The threshold concepts pupils should understand.

c) Criteria for progression within the threshold.

d) Criteria for the depth of understanding (Basic, Advancing and Deep)

Our curriculum distinguishes between subject topics and threshold concepts. Subject topics are the specific aspects of subjects that are studied.

Threshold concepts tie together the subject topics into meaningful schema. The same concepts are explored in a wide breadth of topics. Through this 'forwards-and-backwards engineering' of the curriculum, pupils return to the same concepts over and over, and gradually build understanding of them.

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Each Threshold Concept is explored within different contexts so that it has tangibility and meaning. Breadth of contexts ensures that children gain relevant knowledge and can transfer this ***knowledge.***

Know and use numbers

This concept involves understanding the number system and how they are used in a wide variety of mathematical ways.

Add and subtract

This concept involves understanding both the concepts and processes of addition and subtraction.

Multiply and divide

This concept involves understanding both the concepts and processes of multiplication and division.

Use fractions

This concept involves understanding the concept of part and whole and ways of calculating using it.

Understand the properties of shapes

This concept involves recognising the names and properties of geometric shapes and angles.

Describe position, direction and movement

This concept involves recognising various types of mathematical movements.

Use measures

This concept involves becoming familiar with a range of measures, devices used for measuring and calculations.

Use statistics

This concept involves interpreting, manipulating and presenting data in various ways.

Use algebra

This concept involves recognising mathematical properties and relationships using symbolic representations.

For each of the threshold concepts there are three milestones, each of which includes the procedural and semantic knowledge pupils need to understand the threshold concepts, provide a progression model.

Cognitive science tell us that working memory is limited and that cognitive load is too high if pupils are rushed through content. This limits the acquisition of long-term memory. Cognitive science also tells us that in order for pupils to become creative thinkers, or have a greater depth of understanding, they must first master the basics, which takes time.

Within each milestone, pupils gradually progress in their procedural fluency and semantic strength through three cognitive domains: basic, advancing and deep. The goal for pupils is to display sustained mastery at the advancing stage of understanding by the end of each milestone and for the most able to have a greater depth of

understanding at the deep stage. The time-scale for sustained mastery or greater depth is, therefore, two years of study.

The Diagram below shows a model of our curriculum structure:

<table>
<tr><td colspan="3">Curriculum Map for Years 1 and 2</td><td colspan="3">Curriculum Map for Years 3 and 4</td><td colspan="3">Curriculum Map for Years 5 and 6</td></tr>
<tr><td colspan="9">Threshold Concepts</td></tr>
<tr><td colspan="3">Milestone 1</td><td colspan="3">Milestone 2</td><td colspan="3">Milestone 3</td></tr>
<tr><td>B
Year 1</td><td>A
Year 1/2</td><td>D
Year 2</td><td>B
Year 3</td><td>A
Year 3/4</td><td>D
Year 4</td><td>B
Year 5</td><td>A
Year 5/6</td><td>D
Year 6</td></tr>
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As part of our progression model we use a different pedagogical style in each of the cognitive domains of basic, advancing and deep. This is based on the research of Sweller, Kirschner and Rosenshine who argue for direct instruction in the early stages of learning and discovery-based approaches later. We use direct instruction in the basic domain and problem-based discovery in the deep domain. This is called the reversal effect.

Implementation

Our curriculum design is based on evidence from cognitive science; three main principles underpin it:

• Learning is most effective with spaced repetition.

• Interleaving helps pupils to discriminate between topics and aids long-term retention.

• Retrieval of previously learned content is frequent and regular, which increases both storage and retrieval strength.

In addition to the three principles, we also understand that learning is invisible in the short term and that sustained mastery takes time.

Our content is subject specific. We make intra-curricular links to strengthen schema.

Continuous provision, in the form of daily routines, replaces the teaching of some aspects of the curriculum and, in other cases, provides retrieval practice for previously learned content.

Planning

Planning is undertaken at three levels:

Long term *planning is based on the programmes of study in the 2014 Curriculum.*

Medium term *planning is carried out termly. Teachers select their focused key performance indicators and objectives from the Chris Quigley's Essentials Curriculum Milestones which are matched to the 2014 National Curriculum. These sre then linked to the progress drives within the big maths structure. At Laurel Avenue Community Primary School we are building on the development of mastery in maths.*

Short term *planning is carried out weekly using an online Big Maths Planner where the big maths progress steps are directly related to National Curriculum requirements and therefore Chris Quigley's Essentials Curriculum Milestones. These plans include key performance indicators, resources to be used, any differentiation, vocabulary and questions, opportunities for assessment and reflect the structure of Big Maths.*

Teaching and learning style

The school uses a variety of teaching and learning styles in mathematics lessons. Our principal aim is to develop children's mathematical knowledge, skills and understanding whilst providing experience and opportunities which allow children to investigate and apply learning. We do this through a daily lesson which covers the National Curriculum 2014 requirements, through the use of Big Maths and by weaving all aspects of maths into our topics and wider curriculum.

Big Maths

Whilst not being a scheme Big Maths ensures every child has the best opportunity to become fully numerate through the progression, continuity and coverage provided within a simple framework of learning steps. Big Maths provides steps of learning rather than lessons for learning, therefore allowing teaching staff to retain creative flair and individuality. Each year group has clear progress drives with a heavy skills development and number focus in the areas of Counting, Learn-Its, It's Nothing New, Calculation and within Key Stage 2, Column Methods. All National Curriculum 2014 objectives are fully matched to these areas and key skills and knowledge are constantly revisited and built upon. SAFE (Shape, Amounts, Fractions and progress drives are also used to cover shape and position, fraction, measures and algebra.

'Get it, Then use it'

Children always acquire Core Knowledge before applying it to Wider Maths. This ensures children approach all problems with the skills and confidence needed to

succeed. Gradually, build up a child's knowledge through the Learning Steps, challenging them with wider and deeper problems.'

(Big Maths)

Staff at Laurel Avenue Community Primary school have developed a calculation policy which supports the progress drives of Big Maths and sets out the expectations at each stage of learning (see Calculation Policy).
Parents are provided with a guide to the calculation strategies used.

Assessment

At Laurel Avenue Community Primary School we recognise that Assessment for learning lies at the heart of promoting learning and in raising standards of attainment. We further recognise that effective assessment for learning depends on using the information gained.
The assessment procedures within our school encompass:
** Making ongoing assessments and responding appropriately to pupils during 'day-to-day' teaching. These 'immediate' responses are mainly verbal and are not normally recorded.*
**Written feedback in books is in response to the success criteria of the lesson and pupil's work is marked in accordance with the school's marking policy (see Marking Policy)*
** Daily targeted interventions, which are identified both during the lesson and through the marking, are aimed to be carried out the same day in order to ensure immediate action is taken for maximum impact upon learning outcomes*
** Weekly CLIC, Learn It's and SAFE tests are completed online to allow children to maintain skills and to provide detailed weekly feedback to inform planning and intervention*
** Formative Assessments at key statutory points: Entry and exit to EYFS and years 2,4 and 6.*

Teachers also assess children against stages within the Chris Quigley Milestones:

- ***Basic:*** *Following instructions, modelling, explaining, acquiring, refining, high level support*
- ***Advancing:*** *Decision making, reminding, guiding, applying, practising, medium level of support*
- ***Deep:*** *Multi-steps – more than one outcome, justification, coaching, probing, deepening, extending, low level of support.*

This assessment system shows both the breadth and depth of learning and is used to track children's progress and attainment.

Reporting

All parents receive an annual written report on which there is a summary of their child's achievement and attainment in mathematics over the year. At the end of KS1 and KS2, each pupil's level of achievement against national standards is included as part of their annual written report.

Maths and the Wider Curriculum

Wherever possible, we encourage the children to use and apply their learning in everyday situations and pupils are helped to extend their skills into other subjects. In this way pupils will develop an appreciation of the application of their skills in practical uses in for example, computing, design technology, geography and science. The use of current learning is planned into foundation subjects through careful matching of skills and contexts. Areas of the National Curriculum 2014 for Maths are identified to be taught solely outside of the daily maths lesson. These include statistics which can be built into many areas of the curriculum such as science, geography and history; Roman numerals, to be taught as part of the history topic; position and movement objectives such as rotation, reflection and turn which are covered in art and design, computing and geography.

Resources

Resources for the delivery of the maths curriculum are stored both centrally and in classrooms. Everyday basic equipment is kept in classrooms. Additional equipment and topic-specific items are stored in other areas.
Children have the opportunity to use a wide range of resources such as number lines, number squares, digit cards and small apparatus to support their work. They use ICT in mathematics lessons where it will enhance their learning, as in modelling ideas and methods. Practical investigations and hands on experience is used as an essential learning tool for areas such as shape and measures.

Display

We recognise the importance of displays in the teaching and learning of mathematics. Every class displays relevant mathematical information which is consistent throughout the school and reflect Big Maths progress drives currently being studied as well as resources to support. This is appropriate to the age of the class. These may

include number lines, number grids, vocabulary and other display materials that provide a visual support for the children's mental processes.

Equal Opportunities

At Laurel Avenue Community Primary School all children are given the opportunity to achieve their best. As a school we endeavour to maintain an awareness of, and to provide for equal opportunities for all our pupils in mathematics. We aim to take into account cultural background, gender and Special Needs, both in our teaching attitudes and in the published materials we use with our pupils.

Children with Special Educational Needs and the More Able

All children receive high quality inclusive teaching. Where possible, we aim to fully include SEN pupils in the daily mathematics lessons so that they benefit from quality first teaching as well as high levels of individual support and participating with other children in demonstrating and explaining their methods. There are high expectations for all pupils. Resources are provided to encourage children to learn independently and support their learning. Specialist resources are also used, where appropriate. When planning, teachers will address the child's needs through simplified, extended or modified tasks (BAD teaching and learning). Support staff are deployed effectively to support, extend and challenge children in their learning

Impact

Because learning is a change to long-term memory, it is impossible to see impact in the short term.

We do, however, use probabilistic assessment based on deliberate practice. This means that we look at the practices taking place to determine whether they are appropriate, related to our goals and likely to produce results in the long run.

We use comparative judgement in two ways: in the tasks we set and in comparing a pupil's work over time.

We use lesson observations to see if the pedagogical style matches our depth expectations.

Monitoring

The Mathematics subject lead and class teachers are responsible for monitoring the standard of the children's work and the quality of teaching in Mathematics. The subject lead is responsible for supporting teaching staff in the teaching of Mathematics and for providing a strategic lead. The subject lead completes an annual report where they evaluate the strengths and weaknesses in the subject and indicate areas for further improvement. Throughout each academic year, the subject lead will undertake the monitoring of Mathematics across the school.

Signed:
Chair of Curriculum and Standards Committee
Signed:
Subject lead

Reviewed: January 2023

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