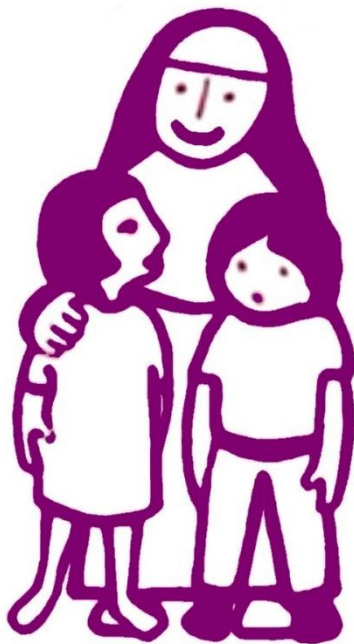


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Alice Ingham RC Primary School



Journeying to Excellence Through
Faith and Learning

Mathematics Policy

2021/22

To be reviewed September 2022



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“So teach us to number our days, that we may apply our hearts unto wisdom.”

Psalms 90:12

Give of your hearts to serve and your hearts to love.

Introduction

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.

National Curriculum - 2014

The National Curriculum for mathematics aims to ensure:

All pupils develop mathematical fluency –

become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems.

There is an emphasis on problem-solving throughout, making connections across mathematical ideas and applying knowledge in other subject areas.

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.

All pupils can reason mathematically

following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.



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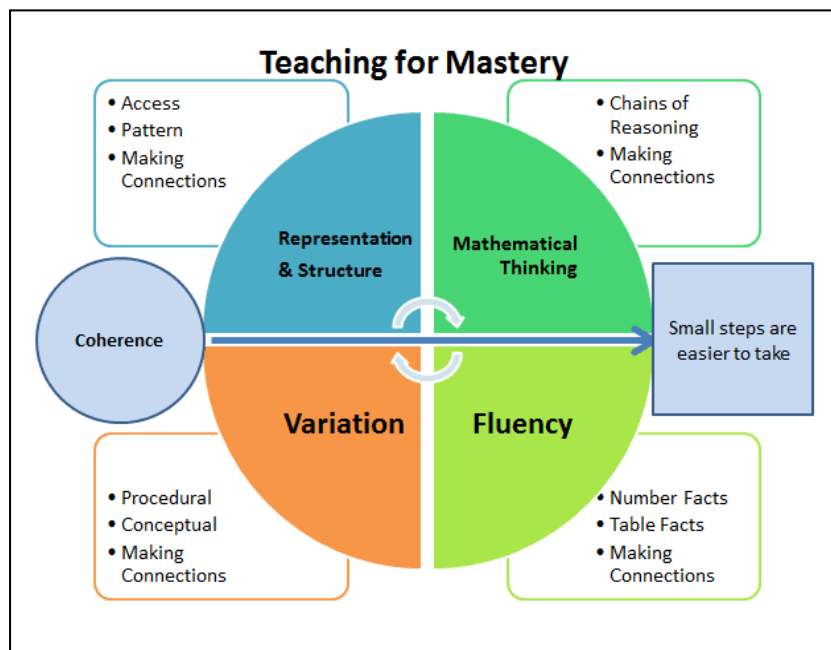
The Purpose of Mathematics in our school is to develop:

- positive attitudes towards the subject and awareness of the relevance of mathematics in the real world
- competence and confidence in using and applying mathematical knowledge, concepts and skills
- an ability to solve problems, to reason, to think logically and to work systematically and accurately
- initiative and motivation to work both independently and in cooperation with others
- confident communication of maths where pupils ask and answer questions, openly share work and learn from mistakes
- an ability to use and apply mathematics across the curriculum and in real life
- an understanding of mathematics through a process of enquiry and investigation

We aim to provide a stimulating and exciting learning environment that takes account of different learning styles and uses appropriate resources to maximise teaching and learning.

Teaching for mastery – At Alice Ingham, we use a Teaching for mastery approach to the teaching and learning in mathematics.

Mastering maths means acquiring a deep, secure and adaptable understanding of the subject. Central to the development of mastery in our classrooms, here, at Alice Ingham are the “five big ideas”- these have been drawn from research evidence, underpinning teaching for mastery.



This diagram is used to help bind these ideas together: in school, we recognise that a clear understanding of these ideas will only come after professional dialogue between teachers during which staff explore how these concepts are reflected in day-to-day maths teaching. In addition to this appropriate CPD has been sought for the Senior Leaders and class teachers so they are able to deliver a teaching for mastery curriculum.

Coherence - Connecting new ideas to concepts that have already been understood, and ensuring that, once understood and mastered, new ideas are used again in next steps of learning- all steps being small steps.



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Representation and Structure - Representations used in lessons expose the mathematical structure being taught. These representations are practical and pictorial models. The aim being that students can do the maths without recourse to the representation. A consistent approach to representations and structures are applied throughout school.

Mathematical Thinking - If maths concepts are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others.

Fluency - Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics. **Procedural fluency** is the ability to apply procedures accurately, efficiently, and flexibly; to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognise when one strategy or procedure is more appropriate to apply than another.

Variation - Varying the way a concept is initially presented to students, by giving examples that display a concept as well as those that don't display it. Also, carefully varying practice questions so that mechanical repetition is avoided, and thinking is encouraged.

At Alice Ingham, we use Power Maths which is a progressive scheme designed with the principles outlined above. The scheme is used from Reception through to Year 6. The use of the Power Maths scheme also ensures there is a progressive, consistent approach to calculation and the use of representations and structures.

Teacher Planning and Organisation

Long Term Planning

The National Curriculum for Mathematics 2014, Development Matters and Early Learning Goals (Number, Shape Space and Measure) provide the long term planning for mathematics taught throughout the schools.

Medium Term Planning

All year groups including EYFS will use the Planning Documents relating to the Power Maths curriculum. These are found within Active Learn Online platform under the relevant year group.

The documents provide teachers with exemplification for maths objectives and are broken down into fluency, reasoning and problem solving, key aims of the National Curriculum. They support a mastery approach to teaching and learning and have number at their heart. They ensure teachers stay in the required age range and support the ideal of depth before breadth. They support pupils working together as a whole group and provide plenty of time to build reasoning and problem solving elements into the curriculum.



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Short Term Planning

The above documents support weekly lesson plans which are created by the class teacher. The weekly plan details the teaching and learning each day and ensure the needs all children are met in the lesson. At the end of each session, an evaluation needs to be recorded on their planning sheet. Weekly plans and evaluations will be monitored at intervals by the mathematics subject leader and members of the SLT (Senior Leadership Team).

For every lesson, teachers should plan for the week ahead ensuring they adapt their planning throughout the unit to take into account the children's individual learning needs. This means that even though all children are working through topics at the same rate the more able mathematicians are given opportunities within the lessons to deepen their understanding eg: through challenge activities supplied through Power Maths, the NCETM, Convince Me Cards or other resources. It also means that additional support for individual children can be planned accordingly.

EYFS planning is also taken from the Active Learn online platform.

All classes have a daily Power Maths lesson where possible. In Key Stage 1, lessons are 45-60 minutes long and in Key Stage 2, lessons should be up to 60 minutes in duration. Teachers of the EYFS ensure the children learn through a mixture of adult led activities and child initiated activities both inside and outside the classroom.

Power Maths Lesson Structure

The children should work through the activities in the textbooks and workbooks. A proposed lesson structure is as follows:

- **Discover** – The discover part of the lesson puts the learning into context. It starts each lesson with a problem, which will allow the children to use prior learning in their attempts to solve it but will also unveil the new learning which will take place during the lesson. The children will work in pairs or small groups when trying to solve the problem.
- **Share** – The teacher takes ideas from the children about how to solve the problem. The teacher, if necessary, will also model how to solve the problem using appropriate manipulatives which will support the children in their understanding and learning.
- **Think Together** – This allows additional teaching input if necessary by working through some examples. For some children, they might not need the additional input and will be able to work at their own pace through this section of the lesson.
- **Independent Work** – The children complete their independent practice in their own maths book. The questions are taken from the maths scheme ensuring they are progressive year on year. The children are able to access mathematical equipment should they need it to develop their understanding. Although the intended outcome is for the children to work through the tasks independently, adult support will be provided for those children who need it. The expectations of the children is different depending on the ability of the children. To meet the needs of the children, some might need additional tasks to deepen their understanding. As discussed above, these can be provided through the Power Maths challenges, the NCETM or Convince Me Cards.



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- **Reflect** – All children complete the Reflect. This allows the lesson to be brought to a conclusion. It allows all children to look back on what they feel they have learnt during the lesson.
- Immediate intervention in the afternoon or before the next lesson for those who have not understood the learning objective.

CLIC Sessions:

The daily Power Maths lesson should be preceded by a CLIC session.

Monday through Thursday, the daily CLIC session should be approximately 15-20 minutes in length. The CLIC session is designed to teach the key fluency skills and key number facts which the children should possess.

The CLIC session is made up of 4 very different parts.

C – Counting. (2 minutes max) The children need to experience counting every single day. Counting goes from counting to 10 in reception through to counting in hundredths in year 6. It also includes reading numbers and will work alongside the place value work the children will complete in their maths lessons.

L - Learn Its. (10 minutes max) The children need to know key number facts eg: doubles, number bonds or times tables. In years 5 & 6, the children could look at key fractions, decimal and percentage equivalents as number facts to learn. The number facts can be taught in a variety of different ways and there are a large number of resources available in school and online to aid the teaching of the key number facts.

It is essential children are secure with the number facts for their age and intervention should be put in place if children fall behind with these.

The children will undergo a Beat That Learn It Challenge each Friday.

I – It's nothing new – (3-4 minutes) this allows the children to expand on their use of number facts eg: if $5 \times 3 = 15$, I also know that $3 \times 5 = 15$, $15 \div 3 = 5$, $15 \div 5 = 3$.

It also allows them to expand their knowledge eg:

I know $5 \times 3 = 15$ so I also know:

$$50 \times 3 = 150$$

$$500 \times 3 = 1500$$

$$0.5 \times 3 = 1.5$$

C – Calculation – (10 minutes max). This session should be based on weaknesses which have been identified through the PiXL means of assessment.

Each Friday, the children will complete a mini-assessment so that the area which has been taught in calculation through the week can be re-assessed.



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Assessment

Assessment is an integral part of teaching and learning and is a continuous process. Teachers make assessments of children daily through;

- regular marking of work
- analysing errors and picking up on misconceptions (use the Power Maths, Teacher tutorial for advice regarding potential misconceptions before teaching the units).
- asking questions and listening to answers
- facilitating and listening to discussions
- making observations
- allowing children to reason

The children will take part in the weekly Learn It assessments.

These ongoing assessments inform future planning and teaching. Lessons are adapted readily and short term planning evaluated in light of these assessments.

Medium term

Termly assessments are carried out across the school using the assessment materials for each year group provided by PiXL and PUMA.

These are analysed and the results are used alongside judgements made from class work and the weekly assessments detailed above to support teachers in making a steps assessment for each child.

Pupil Progress meetings are timetabled each term for all classes. Progress of pupils is discussed and appropriate intervention considered and put in place where appropriate.

Long term

Y2 and Y6 complete the national tests (SATs) in May.



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Concrete, Visual, Abstract:

A key principle behind the teaching and learning in Maths and Maths Mastery is based on the concrete, visual and abstract approach.

Pupils are first introduced to an idea or skill by acting it out with real objects (a hands-on approach). As the children become more competent with their understanding, the real objects can be replaced by other objects such as Base 10 or Place Value counters.

Pupils then are moved onto the visual stage, where pupils are encouraged to relate the concrete understanding to pictorial representations. Children are provided with Maths Journals so they are able to draw their visual representation of problems before solving them. This should be developed alongside the teaching of the Bar Model approach for visualising mathematical problems and should follow the Power Maths progression in bar models and the Visual Bar Modelling Policy which is in place across the school.

The final abstract stage is a chance for pupils to represent problems by using the formal methods of calculation and should be in line with the school's calculation policy.

Marking

Marking of children's work is essential to ensure they make further progress. Work is marked against the learning objective in line with the school marking policy.

Children are encouraged to self-assess their work and given time to read teachers' comments and make corrections or improvements. Responses to marking are made as close to the work as possible, ideally at the start of the next lesson.

Special educational needs & disabilities (SEND)

Daily mathematics lessons are inclusive to pupils with special educational needs and disabilities. Where required, children's IEP's incorporate suitable objectives from the National Curriculum for Mathematics or Development Matters and teachers keep these in mind when planning work. These targets may be worked upon within the lesson as well as on a 1:1 basis outside the mathematics lesson. Maths follow up intervention in school helps children with gaps in their learning and mathematical understanding. In addition, where necessary, specific intervention might be put in place overseen by the SENCO and/or the class teacher.

Within the daily mathematics lesson, teachers have a responsibility to provide differentiated activities to support children with SEND. In addition to this, teachers must provide sufficient challenge for children who are high achievers via deepening activities explained in this policy.

Equal Opportunities

Positive attitudes towards mathematics are encouraged, so that all children, regardless of race, gender, ability or special needs, including those for whom English is a second language, develop an enjoyment and confidence with mathematics. This policy is in line with the school's 'Racial Equality' policy.



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The aim is to ensure that everyone makes progress and gains positively from lessons and to plan inclusive lessons. Lessons involving lots of visual, aural and kinaesthetic elements will benefit all children including those for whom English is an additional language (EAL).

Maths across the Curriculum

Wherever possible, links should be made with other areas of the curriculum which allows the children to use and apply their Maths skills in “out of Maths lessons” situations. These opportunities are important to give children a real life meaning to the maths skills they have been taught.

Role of the Maths Subject Leader

- To lead in the development of maths throughout the school.
- To monitor the planning, teaching and learning of mathematics throughout the trust.
- To help raise standards in maths.
- To provide teachers with support in the teaching of mathematics.
- To provide staff with CPD opportunities in relation to maths within the confines of the budget and the individual School Improvement Plan
- To monitor and maintain high quality resources.
- To keep up to date with new developments in the area of mathematics



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APPENDICES

Appendix 1

The Learn Its Challenges

There are 15 different Learn Its Challenge assessments. Children progress through them incrementally from 1 to 15.

The 15 Learn Its Challenges are perfectly aligned to the 15 steps of the Learn Its Progress Drive.

Each step of the Learn Its Progress Drive is itself linked to a term by term minimum expectation from CLIC on Your Planning. All children without a genuine learning difficulty for recall should keep track with this schedule, many children will be ahead of this journey.

In summary this can be seen in the following table:

Step	Addition Learn Its	Multiplication Learn Its	Term from 'CLIC on Your Planning'
15		X12 Table	Y4: Term 3
14		X11 Table	Y4: Term 2
13		The Six Fact Challenge!	Y4: Term 1
12		X8 Table	Y3: Term 3
11		X4 Table	Y3: Term 2
10		X3 Table	Y3: Term 1
9	5+9, 6+9, 7+9, 5+7, 5+8, 6+8	X2 Table	Y2: Term 3
8	5+4, 5+6, 6+7, 8+7, 8+9	X5 Table	Y2: Term 2
7	3+8, 3+9, 4+7, 4+8, 4+9	X10 Table	Y2: Term 1
6	6+6, 7+7, 8+8, 9+9	Multiples of 2 – In counting	Y1: Term 3
5	4-2, 5+2, 6+2, 7+2, 9+2, 4+3, 5+3, 6+3		Y1: Term 2
4	1+9, 2+8=10, 3+7=10, 4+6, 5+5=10	Multiples of 5 – In counting	Y1: Term 1
3	2+1, 2+3	Multiples of 10 – In counting	Rec: Term 3
2	3+3, 4+4, 5+5		Rec: Term 2
1	1+1, 2+2		Rec: Term 1