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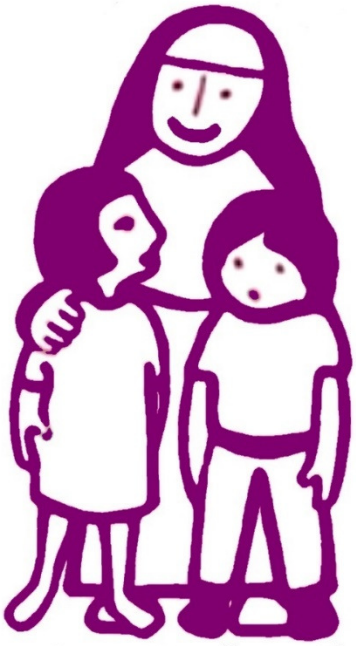
Alice Ingham RC Primary School



Journeying to Excellence Through Faith and Learning

Mathematics Policy

Approved by:		**Date:**
Last reviewed on:	September 2019	
Next review due by:	September 2021	

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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 schools 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.

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.

Short Term Planning
The above documents support daily lesson planning but must be annotated and adapted where necessary to ensure they meet the needs of the children. At the end of each session, an evaluation sheet needs to be completed. Planning and completed evaluation sheets will be monitored at intervals by the mathematics subject leader and members of the SLT (Senior Leadership Team).

EYFS planning is also to be 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.

In Key Stages 1 and 2, teachers should plan for the unit ahead ensuring they adapt their planning throughout the unit to take into account the children's learning needs ensuring that all children are working through topics at the same rate but the more able mathematicians are given opportunities within the lessons to deepen their understanding. Where necessary, teachers can use additional resources from the NCETM, Convince Me Cards or from the Big Maths online resources.

Using the Power Maths format, teachers will ensure they include all three elements to mathematics (fluency, reasoning and problem solving) into each lesson.

Fluency:
Fluency is the raw skills needed in mathematics. These might be the learning of key number facts or the developing of key skills for example: methods of carrying out the four operations in maths (addition, subtraction, multiplication and division).

The two main resources, which are used to support the child's learning in developing their fluency are The Sense of Number Calculation Policy and the Big Maths Beat That Challenges.

The Sense of Number Visual Calculation Policy provides a visual representation of our written and mental calculation policy. The policy allows the teaching of calculation from practical starting points through to formal written methods ensuring that basic skills are embedded and that new learning is a small step for the children.

Big Maths Beat That Challenges are weekly assessments of a child's development in their application of calculation and the outer areas of maths (see separate Big Maths section). It also allows for the children to learn and apply their known number facts which the child should learn from Reception right through to year 6.

Reasoning:
To ensure children are able to be fluent with a good 'sense of number' pupils need a range of experiences where they can talk though strategies, discuss possible answers and justify their outcomes. Children need to know 'how' and 'why' numbers work the way they do and be able to explain this.

Reasoning should be a daily expectation within Maths lessons to allow children regular opportunities to explore numbers, make conjectures, investigate patterns, explain possibilities and represent findings.

There is a five step progression to reasoning which shows the stage within reasoning which the children are working at.

1. Describing
2. Explaining
3. Convincing
4. Justifying
5. Proving

To enable a child's reasoning skills to progress, the teacher should apply the twelve Reasoning structures which have been demonstrated through INSET days and staff meetings. They are:

- Describe Create
    - What do you notice?
    - Draw me, make me, Tell me why!
    - Tell me a story
- Properties of Number / Shape etc
    - What's the same? What's different?
    - Odd one Out
    - Guess my number / shape
- Higher level number properties, real life calculations, solving problems
    - Here's the answer, what's my question?
    - Because I know…
    - How do you know?
- Explanation / Depth of Thinking / Higher level reasoning
    - Spot the mistake
    - What's missing
    - Sometimes / Always / Never

To assist the teacher, various resources have been made available on the Staff Drives (Convince Me Cards and White Rose Maths Hub resources). There are also additional resources available through Big Maths online Prove Its.

Problem Solving:

Once the children are secure with the key skills and the key number facts, they need to be able to use and apply them. This can be in a variety of different ways:

- Word Problems
- Visual Problems
- Finding all the Possibilities
- Logic Problems
- Rules and Patterns

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In allowing children to use their mathematical knowledge to solve problems, it improves their confidence in maths but also it allows them to develop other skills.

- Pattern Spotting
- Working Systematically
- Using diagrams and other pictorial representations
- Working Backwards
- Trial and Improvement
- Visualising
- Conjecturing and Generalising

Power Maths Lesson Structure

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

- Power Up or another mental starter of the teacher's choosing
- Discover
- Share
- Think Together – using the I do, we do, you do approach (some teachers use the textbooks but others prefer to just display it on the screen)
- Practice Books
- Deepening activities for those that may need extending further – use the NCETM cards, BIG Maths Prove Its, or Convince me Cards
- Immediate intervention in the afternoon or before the next lesson for those who have not understood the learning objective.

CLIC Sessions:

In addition to the daily Power Maths lesson, children should be taught a separate CLIC session. This is to be a standalone lesson taught outside of the Power Maths lesson and should be timetabled accordingly.

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.

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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.

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

It also allows them to expand their knowledge eg:

I know 5 x 3 – 15 so I also know:

50 x 3 = 150

500 x 3 = 1500

0.5 x 3 – 1.5

C – Calculation – (10 minutes max). This session should be based on the weaknesses from the previous week's CLIC and SAFE challenges. Once you have input the scores onto the BIG Maths website there is a quick link which clearly shows which questions needs to be targeted and these are the ones you need to focus on.

Friday's CLIC session is for the BIG Maths Challenges.

BIG Maths Challenges

Big Maths Beat That! Challenges consist of the

- CLIC Challenges,
- Learn Its Challenges, and
- SAFE Challenges.

Collectively, they provide a set of age-related questions that assess a child's ability across a wide area of Maths. The challenges allow a teacher to measure the progress of each child on a weekly basis.

These challenges should be delivered in a fun way, which the children look forward to and enjoy completing them. The whole point of 'Big Maths Beat That!' is that it offers all children the opportunity to feel good about their maths, along with the support of great teaching. The children are not competing against their peers but only against themselves – eg: trying to BEAT THAT previous week's score.

The CLIC Challenge (Counting, Learn Its, It's Nothing New and Calculation)

There are 20 different CLIC Challenge assessments. Children progress through them incrementally from CLIC 1 to CLIC 20. Each of the 20 CLIC Challenges has 10 questions. The 10 questions for each CLIC challenge sum up the minimum expectation of where a child should be on their numeracy skills journey.

Each child should be assigned a CLIC level which is determined by their year group and the academic term. During the term, each child should make progress in their scores, so that as the term nears an end, the children are confident and ready to move on to the next CLIC challenge in the new term. (Please see appendix 1 for details of which CLIC challenge the children should be working on).

The only reason why the child should not be working on their required level of CLIC challenge is if they are not working at an age-expected level.

The children attempt to answer all of the questions on the sheet. It is untimed but teachers might want to use their discretion (suggest 10 minutes maximum).

For the younger children, an adult might need to be present to administer some of the questions (an icon 'T' is shown to indicate where). Many of these earlier assessments will take place during the week's teaching and learning activities rather than sitting with each child individually on a Friday. For children who are in Reception, their CLIC assessment will be throughout the term rather than on an individual Friday.

Learn Its

There are 15 different Learn It Challenge Assessments. Children progress through them incrementally from Step 1 (starting in Reception) through to Step 15 (End of Year 4). Each step of the Learn Its Challenges is linked to a term by term minimum expectation – and links in with the National Curriculum. All children should be on the Ultimate Challenge by the start of Year 5 *(see appendix 2 for details of the Steps each child should have reached in their journey through school).*

All children without a genuine learning difficulty for recall should keep track with this schedule, many children will be ahead of this journey and, unlike the CLIC and SAFE challenges, it is important to allow children to progress though the Learn Its as fast as possible.

Further Learn Its are to be developed for the children in years 5 and 6.

Learn It Challenges are timed. The time is determined by the Step the child is working on.

Step 1 – 4	20 seconds per step
Step 5 – 15	30 seconds per step*
Ultimate	90 seconds

* Steps 7-9 are quite challenging with a lot of Learn Its to recite – if the child is secure with their number facts a little extra time can be given to allow them to complete the challenge – the decision is for the class teacher to make.

The child will work on their Learn It Challenge plus they will also go back over the previous two learn it challenges: For example: If they are working on their 8 Times Tables (Step 12) they will also continue to work on their 4 Times Tables (Step 11) and their 3 Times Tables (Step 10).

The Learn It challenges should be a formality and the child should be able to, very quickly, write out the answers. It becomes a celebration of their learning and allows them to grow in confidence. If they are hesitant, then they are not ready for this assessment and the teacher must consider if the assessment one step down would be more appropriate. From the teacher's point of view, this means that any learning gaps that have sneaked through the system can quickly be identified and addressed. It also means the previous two steps of recall are being further consolidated.

The children do not receive an identical Learn Its Challenge each week as they may start to simply remember the answers and there are 10 different versions of the same Step. This way the children have the same standard of challenge each week but the order of the questions will change. Consequently, the children must be secure in the number fact rather than the order of the challenge or the times tables.

Each week, the child should take home with them a copy of their Learn It to learn as homework.

SAFE Challenges

The SAFE challenges challenge the "outer" areas of maths: it covers the smaller areas of the Maths curriculum and are a great way of keeping the plates spinning for these "outer" areas. Like the CLIC challenges, they are a weekly assessment covering fractions, shape, measure, data handling and algebra. By doing the weekly SAFE challenge, it keeps these areas fresh in the minds of the children even though they might not have been a part of a recent Maths lesson.

Beat That Fridays

The CLIC, Learn It and SAFE Challenges are to be carried out each Friday. The CLIC and SAFE challenges should take no longer than 10 minutes to administer and The Learn Its should take 2-3 minutes.

The Beat That challenges, ***should not replace the Friday Maths lesson*** and should take place out of the actual maths lesson.

Before every Beat That Friday, the Big Maths song should be played in class and children (and adults) are encouraged to join in with the responses.

Once the challenges have been completed, the scores need to be entered onto the Big Maths online programme. This task can be completed by either the class teacher or a teaching assistant. However, it is the class teacher's responsibility to check which, are the common gaps across the class. There are online tools, which are available to show the weaker areas, which should be a focus of future CLIC sessions as either a whole class or small group intervention.

When all of the scores have been entered onto the Big Maths online programme, it is important to celebrate the children's achievements. The Big Maths online programme will automatically print out individual certificates which can be presented to the children in class.

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 Big Maths Challenges.

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 (with the exception of Year 6) provided by NFER.

These materials used alongside judgements made from class work and the weekly assessments detailed above support teachers in making a steps assessment for each child, which in line with the assessment policy they enter onto o'Track.

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.

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).

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 Visual Calculation Policy.

Pupils' Records of work
Children are taught a variety of methods for recording their work and are encouraged and helped to use the most appropriate and convenient. Children are encouraged to use mental strategies, then using jottings before resorting to more formal written methods. Children's own jottings to support their work are encouraged throughout all year groups.

Wherever possible, the child's maths journal and workbook should reflect the learning, which takes place during the lesson.

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.

Some pieces of work in mathematics can be marked by children themselves, exercises involving routine practice with support and guidance from the teacher – particularly in years 5 & 6.

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.

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).

Homework

Homework allows children to develop and consolidate skills and concepts learnt in the classroom and to explore aspects of the curriculum within the home environment. It also offers the opportunity for parents to learn more about the work their children do at school, and participate more fully in that learning.

Homework can help children to be more independent and give them the opportunity to show initiative. We ask parents to encourage their children to think for themselves but at the same offer help and guidance if needed.

Parents and children are welcome and encouraged to seek the help of the teaching staff if there is a difficulty or if they consider their child is not benefiting from the work at home.

Each week, every child should receive one piece of Maths homework. This will be set alongside the work children complete in class. In addition to this, every child will also receive a Learn It (see above) for them to learn the key number facts on which they will be assessed in the following Big Maths Challenge.

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. Topic and Science planning should be adjusted to show the lessons, which will allow children to use and apply these skills.

Role of the Maths Subject Leader

- To lead in the development of maths throughout the trust.
- 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

APPENDICES

Appendix 1

The CLIC Challenge Schedule

CLIC Challenge	Term from 'CLIC on Your Planning'	
CLIC 1	Rec	Term 1
CLIC 2		Term 2
CLIC 3		Term 3
CLIC 4	Y1	Term 1
CLIC 5		Term 2
CLIC 6		Term 3
CLIC 7	Y2	Term 1
CLIC 8		Term 2
CLIC 9		Term 3
CLIC 10	Y3	Term 1
CLIC 11		Term 2
CLIC 12		Term 3
CLIC 13	Y4	Term 1
CLIC 14		Term 2
CLIC 15		Term 3
CLIC 16	Y5	Term 1
CLIC 17		Term 2
CLIC 18		Term 3
CLIC 19	Y6 - Term 1	
CLIC 20	The Platinum Challenge	

Appendix 2

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