



ISAAC NEWTON ACADEMY MATHEMATICS POLICY (PRIMARY)

At Isaac Newton Academy our aim is to equip every student with the knowledge, learning power and character necessary for success at university and beyond. We believe that the development of mathematical skills is of the highest priority. Mastery of primary mathematics is transformative. Pupils who succeed with mathematics during their primary years are significantly more likely to continue their education beyond sixteen and more likely to be in employment as adults. The development of children's natural ability to think logically and solve problems is both enjoyable in its own right and vital for success in a wide variety of fields.

'Mathematics 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.' Mathematics Purpose of Study – National Curriculum 2014

This policy summarises our approach to the teaching of mathematics at Isaac Newton Academy Primary to ensure systematic and consistent practice throughout the school and result in our pupils leaving Isaac Newton Primary as confident and independent learners.

AIMS

We aim to develop in all children:

- a sense of the size of a number and where it fits into the number system
- the ability to master and know by heart the rapid recall of number facts such as number bonds, multiplication tables, doubles and halves
- the ability to develop an understanding of number patterns and relationships
- the ability to calculate accurately and efficiently, both mentally and in writing, drawing on a range of calculation strategies
- the ability to make sense of number problems and recognise the operations needed to solve them
- the ability to explain their methods and reasoning, using correct mathematical terms
- the ability to judge whether their answers are reasonable and have strategies for checking them where necessary
- the ability to suggest suitable units for measuring and make sensible estimates of measurements
- the ability to explain and make predictions from the data in graphs, diagrams, charts and tables
- the ability to develop spatial awareness and an understanding of the properties of 2d and 3d shapes.



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In order to achieve these aims we must:

- provide an environment that promotes a culture of growth mindset
- develop in children a love of problem solving and challenge
- provide exposure to a wide range of challenges which inspire and model a high level of mathematic exploration
- identify pupils who require additional support and intervene with one-to-one and small nurture groups immediately, so that no pupil is left behind
- provide excellent role models.

TEACHING & LEARNING

We believe in depth before breath. As an Ark School we follow the Maths Mastery curriculum, a rigorous and systematic programme that has been developed to ensure that every child can achieve excellence in mathematics. It provides pupils with a deep understanding of the subject through a concrete, pictorial and abstract approach. This ensures that pupils fully understand what they are learning and what they are doing rather than just learning to repeat routines without grasping what is happening.

A mathematical concept or skill has been 'mastered' when, through practice and application over time, a pupil can represent it in multiple ways, has the mathematical language to be able to communicate related ideas, and can think mathematically with the concept so that he/she can independently apply it to a totally new problem in an unfamiliar setting. Mastery is demonstrated when a pupil is able to apply a concept to a totally new problem in an unfamiliar context or situation. To achieve Mastery, more time is spent on topics to ensure that every child has understood what he/she is learning. The Maths Mastery lessons build a number of explicit opportunities for the pupils to apply the newly learned skills.

Teachers adopting a mastery approach believe that a child's mindset is more important than prior attainment in determining the progress that he/she will make. Pupils with a growth mindset will make better progress than pupils with a fixed mindset.

Learners with a growth mindset:

- believe that effort creates success
- believe that skill and attainment can be increased over time
- view mistakes as an opportunity to develop
- are resilient
- think about how they learn.

Children whose parents have a growth mindset and high expectations perform better, they tend to try harder, have more confidence and are more motivated to learn. It is therefore important that whilst we work on changing and developing the mind-set of our pupils, we also work with our parents to ensure they have the highest expectations of their child.



If a child does not fully grasp a new concept at first, it our job as adults to try alternative explanations and approaches. Our first priority is to build a secure foundation in mathematics as a basis for all other learning. Maths lessons are taught daily by the class teacher with the support of the teaching assistants. Lessons are rigorously planned and differentiated in depth to enable every child to access the learning at a point which will help them to maximise their potential. Where pupils need extra support, it is provided to ensure that every child reaches and exceeds nationally expected standards.

Key features of the Maths Mastery curriculum:

- high expectations for every child
- fewer topics, greater depth
- number sense and place value come first
- a research-based curriculum
- the use of objects and pictures before numbers and letters
- problem solving is central
- calculating with confidence – understanding why it works.

A Mastery Curriculum

The mastery approach follows a cumulative, age-related curriculum for depth. Deep understanding is promoted by fewer topics. The skills studied by a child are determined by their school year, with every child in a year group studying the same concepts and skills. All children are given the time to understand something before they move on.

The highest attaining pupils study the same mathematical content as the lowest attaining – what is different is the way in which they are being taught and the level of support they are given.

Challenge is provided through increased depth, rather than acceleration of content. Different learners have different needs, but they do not need different content.

Children can find it difficult to make sense of mathematical concepts in a meaningful way. The Maths Mastery curriculum is based on a belief that pupils deepen their understanding by representing concepts using objects and pictures and by making connections between different representations.

Pupils deepen their understanding by asking and investigating great questions, by giving examples, by sorting and comparing, or by looking for patterns and rules in the mathematics they are exploring.

Communication & Language

Language is vital to mathematics. Mathematical modelling (consideration of a real-life situation and using mathematics to solve it) is a crucial part of the subject. It is essential that the pupils are able to



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articulate their methods, findings and answers and to do so successfully they need explicit help which can only be given by extended discussion. It is often through discussion and listening to others that a pupil's thoughts are modified and expanded, acting as a scaffold for their own thinking.

Pupils deepen their understanding by explaining, creating problems, justifying and proving using mathematical language. In order to deepen children's mathematical understanding, every Maths Mastery lesson includes an activity involving pupil talk either in pairs or small groups. The pupils are always encouraged and reminded to give a full-sentence answer and to use the mathematical vocabulary they have learned.

Multiple Representations

An important part of 'deep understanding' in mathematics is being able to represent ideas in many different ways. Representing mathematics using different objects and pictures to represent abstract concepts is an essential part of 'mastery'. At Isaac Newton Primary the children use manipulatives to represent mathematical concepts e.g. using cubes and beads as well as writing symbols.

Representing ideas in multiple ways ensures support and understanding for lower attaining pupils by giving a sense of meaning to more abstract problems, whilst it also challenges the higher attaining pupils to see a concept differently and to build up their communicative and reasoning skills. Manipulatives also bring an element of fun and engagement to a lesson.

Maths Meetings

An important aspect of the mastery approach is the daily Maths Meeting. It is a fifteen minute whole-class session, used to consolidate key areas of mathematics, which also gives the teachers an opportunity to check pupils' general maths knowledge. It includes singing, whole class response and questioning to ensure that every child is involved, fully participating and enjoying maths. Maths Meetings help the teacher to fill in any gaps in understanding from previously taught lessons, but may also cover other content that may not be explicitly taught in a unit of work during a given week.

The key mathematical concepts that pupils need to know competently in mathematics are as follows and should be covered regularly during Maths Meetings:

- Months of the Year
- Days of the Week
- Weather
- Bar charts
- Shapes
- Patterns and sequences involving addition and subtraction
- Money
- Time
- Place Value.



During Maths Meetings, teachers use a mixture of open and closed questions. Closed questions are used to ensure pace and to elicit a demonstration of knowledge, whilst open-ended questions allow for deeper thought, explanation and discussion.

Successful Maths Meetings should always:

- Be pacy & snappy
- Have 100% pupil participation
- Be fun with chants & rhymes
- Be supported by the Maths Meeting display wall
- Include both open & closed questions
- Use a variety of resources
- Follow the same daily structure.

Assessment

Awareness of children's current skills, knowledge and understanding is key to planning the next step in their learning.

In Maths Mastery, assessment is continuous and an integral part of every lesson. From the beginning of every lesson, teachers and teaching assistants assess what the pupils do or do not fully understand and use this to scaffold each segment of the lesson. Interventions are planned for and 'live', meaning that misconceptions are dealt with immediately and high attaining pupils are challenged appropriately.

More formal assessments take place every half term, whereby the children are assessed on their understanding of the concepts and skills that they are already familiar with.

Recording Work

It is important that pupil progress is recorded. Some of the best learning does not happen on paper and may well have been achieved through the use of paired discussion and using manipulatives. It is paramount that these moments are captured photographically, or via note-taking, to provide a record for staff, pupils and parents. Notes and photographs are then in turn stuck into the pupils' class books with an explanation of the task and learning progress. There should be between 3 to 5 pieces of work or evidence recorded in the pupils' exercise books each week.

Marking

The children's work should be marked on a regular basis and the marking should indicate the level of support the child has received. The comments made should be in green pen (marking policy), child friendly and age appropriate. The child's next steps should also be included. The pupils should be given time to address any comments or feedback they have received.



Planning & Cross-Curricular Links

It is essential that mathematics is embedded across the curriculum. Concepts and skills that have been learnt in mathematics lessons can be applied in a wealth of contexts across the curriculum and allow pupils to explore and discover that mathematics is all around them. If we are encouraging and expecting 'mastery' in mathematics from our pupils i.e. for them to be able to apply their understanding to a range of familiar and unfamiliar contexts, then it is our job as teachers to create those opportunities for them. Many of those opportunities or contexts may be linked to other subject areas. Mathematics concepts will have far more impact if they have relevant meaning. It is also important that explicit links to mathematics are made at every opportunity to help the pupils make links between subjects and their learning.

Embedding the BRIDGES Dispositions across the Mathematics Curriculum

The pupils are encouraged to continually develop their BRIDGES habits and traits throughout the curriculum. Although we have a focus disposition each week, this does not mean that we do not continuously encourage the children to practise them all. The Maths Mastery curriculum lends itself well to helping the children develop all the BRIDGES character traits.

Bravery

The pupils are encouraged to take risks and experiment with mathematical concepts and take leadership of their own learning.

Resourcefulness

The pupils are encouraged to make connections between different areas of mathematics when solving problems. They are also given the opportunity to understand the connections between mathematics and other subject areas and contexts: this in turn helps the children to develop a level of 'mastery'.

Integrity

The pupils are taught to share, 'turn-take' and show the skills needed to be a good talk partner.

Discovery

The pupils are encouraged to use their curiosity and to explore ideas when applying their knowledge and skills to different contexts.

Grit

The pupils are taught to be patient, determined and resilient when faced with new problems or concepts. We foster a growth mind-set approach to all that we do and a can-do attitude and belief.

Emotional Intelligence



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The pupils are encouraged to become reflective learners by listening to and taking on board any feedback given to help them to improve their work. The children are also encouraged to work collaboratively and sensitively towards their peers.

Self- Discipline

The pupils are encouraged to become independent learners and to try first before asking for help or support. We encourage the children to become better organised, ensuring they have their mathematics homework completed and returned on time each week and to help keep the maths resources organised and tidy.

ORGANISATION OF MATHEMATICS

Year Group	Time Allocation
Reception	<ul style="list-style-type: none">• 45 minutes daily Maths Mastery Lesson• 15 minutes daily Maths Meeting
Year 1	<ul style="list-style-type: none">• 60 minutes daily Maths Mastery Lesson• 15 minutes daily Maths Meeting
Year 2	<ul style="list-style-type: none">• 60 minutes daily Maths Mastery Lesson• 15 minutes daily Maths Meeting
Year 3	<ul style="list-style-type: none">• 60 minutes daily Maths Mastery Lesson• 20 minutes daily Maths Meeting
Year 4	<ul style="list-style-type: none">• 60 minutes daily Maths Mastery Lesson• 20 minutes daily Maths Meeting
Year 5	<ul style="list-style-type: none">• 60 minutes daily Maths Mastery Lesson• 20 minutes daily Maths Meeting
Year 6	<ul style="list-style-type: none">• 60 minutes daily Maths Mastery Lesson• 20 minutes daily Maths Meeting

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