Date Policy Agreed by Governors:		**Date Policy to be Reviewed:**	**July 2023**

Introduction

This policy outlines the aims, organisation and management for the teaching and learning of mathematics at Hallgate Primary School.

Mathematics is a life skill. It is an essential element of communication, widely used in society, both in everyday situations and in the world of work. “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).

National Curriculum and Early Years Framework

The Statutory Framework for the Early Years Foundation Stage intends that educational programmes must involve activities and experiences for children, as set out:

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, ‘have a go’, talk to adults and peers about what they notice and not be afraid to make mistakes.

National Curriculum Intent The national curriculum for mathematics intends 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. Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas.

The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

Curriculum Intent

Our children's mathematical journey begins in the Early Years and continues throughout the school to the end of Year 6. By the time children leave Hallgate, all children will be fluent and be able to reason and problem solve.

At Hallgate Primary School, we intend to provide a curriculum which caters for the needs of all individuals and sets them up with the necessary skills and knowledge for them to be successful. We aim to provide a strong foundation for our young learners to build upon in order for them to go on to gain future opportunities for a successful working life. We intend to incorporate appropriate levels of challenge through varied and high-quality activities with a focus on fluency, reasoning and problem-solving. Using the mastery approach, pupils are required to explore maths in depth, using mathematical vocabulary to reason and explain their workings. A wide range of mathematical resources are used and pupils are taught to show their workings in concrete, pictorial and abstract forms. They are taught to explain their choice of methods and develop their mathematical reasoning skills. We encourage resilience, adaptability and acceptance that we can learn through trial and error. Our curriculum allows children to better make sense of the world around them by relating the pattern between mathematics and everyday life.

Vocabulary
We intend to create a vocabulary-rich environment, where talk for maths is a key learning tool for all pupils. We intend to expose all pupils to year group-specific mathematical language. Pupils will be encouraged to use cognitive thinking and mathematical vocabulary to explain their methods.

Knowledge and Skills
It is our intention to provide a broad and balanced education for all pupils that is coherently planned and sequenced towards the cumulative acquisition of knowledge and skills for future learning and employment. A curriculum which provides solid foundational skills which children can build up on and which will foster confidence in maths.

Progression
We intend to use assessment and gap analysis to inform the next steps and to plan for progression. We intend to use carefully sequenced lessons and steps to ensure children secure mathematical understanding. We will use planned opportunities to communicate effectively with parents in regards to progress and to support children beyond the classroom.

Opportunities
When beginning their primary school journey in the EYFS, many children arrive at school with different and sometimes more limited experiences than others. Therefore, our aim is to give children the knowledge and skills to prepare them for what comes next in their lives. This includes the relevant vocabulary needed throughout their education and the opportunity to link maths to real-world problem-solving.

Cultural Capital
Cultural Capital is the essential knowledge that children need to prepare them for their future success – in the world of work, in relationships forged throughout life and as a valued contributor to society. When beginning their primary school journey in the EYFS, many children arrive at school with different and sometimes more limited experiences than others. Therefore, our aim is to give children the knowledge and skills to prepare them for what comes next in their lives. This includes

the relevant vocabulary needed throughout their education and the opportunity to link maths to real-world problem solving.

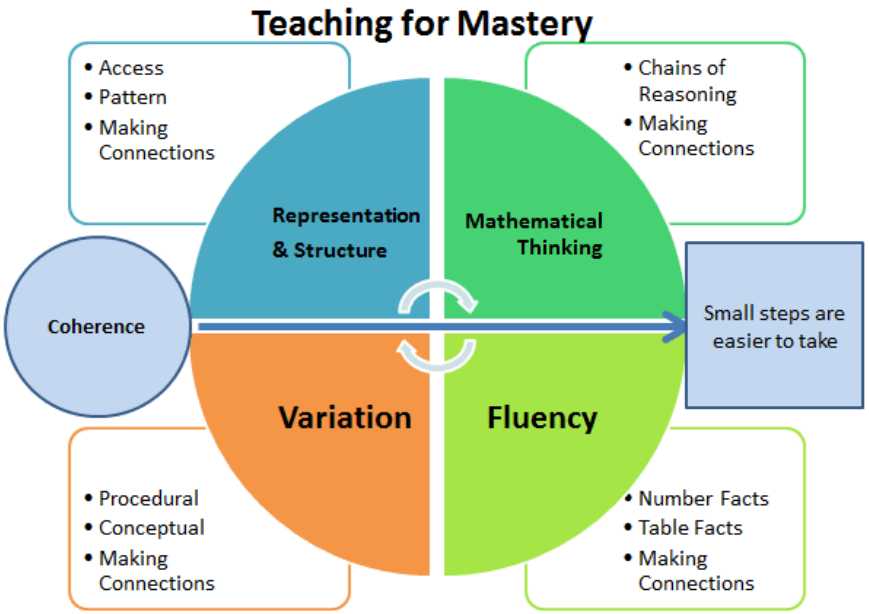
In the Early Years Foundation Stage the sequence of teaching is carefully mapped and broken down into key concepts and sequenced appropriately for the age and stages of the children in our settings. Mathematical concepts are then taught through planned adult directed teaching and continued and deepened through opportunities for children to apply their knowledge and skills in the learning environment. There is a lot of repetition in the learning, revisiting the skills and practising them in a wide range of contexts, to ensure that they are embedded.

Mathematical resources such as blocks for building, number lines, timers, weighing scales, clocks and a wide range of natural resources for counting are always available in the learning environment and children know where to find these resources. We call this our ‘continuous provision’. Staff also meet weekly to plan the learning environment carefully to enable children to apply and extend their understanding in a wide variety of meaningful contexts. We call this our ‘enhanced provision’. The children in F2 have a mathematical challenge set each week that they have to complete to fill their challenge card. Staff develop and embed mathematical language by modelling vocabulary in the context of the children’s free-flow play in the indoor and outdoor environment.

Teaching in the Early Years Foundation Stage is underpinned by the Characteristics of Effective Learning which links to our Super Learners. Teaching ensures that through provision and daily taught sessions, our children are confident at counting with numbers to 5 at the end of Nursery and 10 in Reception. The children develop a deep understanding of the numbers to 5 or 10 , the relationship between them and the patterns between those numbers. They are able to use mathematical language to describe characteristics of number, shape and objects and solving problems. We support our learners in being critical thinkers and strive to ensure the setting is full of mathematical opportunities for children to explore, sort, compare, count, calculate and describe.

Our Maths curriculum follows elements of a Teaching for Mastery approach. At the centre of our maths vision is the belief that all children have the potential to succeed.

The principles of a mastery approach are:



Coherence	Representation and Structure	Mathematical Thinking	Fluency
Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalization of the concept and the ability to apply the concept to a range of contexts.	Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.	If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned and discussed with other.	Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation
Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Our intent focuses on equipping all children with the mathematics they need to master the curriculum for each year group. This requires that **all children**:

- recall key number facts with **speed and accuracy** and use them to calculate and work out unknown facts.
- develop their ability to **apply** mathematical skills with confidence and understanding when **solving problems.**

- apply 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
- express themselves and their ideas using the **language of mathematics** with assurance.
- have sufficient depth of knowledge and understanding to **reason and explain** mathematical concepts and procedures and use them to solve a variety of problems.
- develop **positive attitudes** to mathematics, recognising that mathematics can be both useful and enjoyable.
- nurture a fascination and excitement of mathematics
- are able to **use and apply** the skills in other curricular areas.

These aims apply to all children, regardless of age or ability.

Our expectation is that the majority of children will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of the children's understanding and their readiness to progress to the next stage. Children who grasp concepts rapidly should be challenged by being offered rich and sophisticated problems before any acceleration through new content. Those children who are not sufficiently fluent with earlier materials should consolidate their understanding, including through additional practice, before moving on.

We expect children to make mistakes, analyse them and learn from them, justifying and explaining as they do this. At each stage of learning, children should be able to demonstrate a deep, conceptual understanding of the topic and be able to build on this over time.

There are 3 levels of learning:
- Shallow learning: surface, temporary, often lost
- Deep learning: it sticks, can be recalled and used
- Deepest learning: can be transferred and applied across a variety of different contexts

The deep and deepest levels are what we are aiming for by teaching maths using the Mastery approach. Children must be given time to fully understand, explore and apply ideas, rather than accelerate through new topics. This approach enables pupils to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

Implementation

Organisation in EYFS

- In EYFS, children experience a short daily mathematics lesson. The children are taught in ability groups by an adult; concepts are then reinforced and developed through ongoing provision.
- Children in EYFS will practise their number facts outside of the maths lesson every day for 10 -15 minutes, following the Mastering Number Programme.
- There is always an element of counting forwards and backwards to reinforce this key skill. This can be done in a wide variety of ways to actively involve the children, such as clapping and doing actions. The children practise and recall their previous learning, such as recalling number bonds, doubles, odd or even numbers, one more/ less etc.
- Concepts are taught and reinforced using real life contexts that are relevant to the children. The activities that they complete in their maths lesson are then put into the ongoing

provision for the children to continue using. Staff can then observe and intervene, extending or supporting as required.

- Independent work is practical with one piece of recorded work for the children in F2, which is put in their Wow books and staff indicate whether this has been independent or supported.
- In F2, the children are required to complete a specific mathematical challenge in the ongoing provision to finish their challenge card. This is based on the previous week's learning, it enables the children to practise the skills they have learnt. Staff assess the children's understanding, extend or challenge the children further and address any misconceptions.
- Rhymes and books are used to support and consolidate mathematical concepts. They reread the same book throughout the week and use props, singing, counting and their own mark making to support counting linked to the text.

Organisation - KS1 and KS2

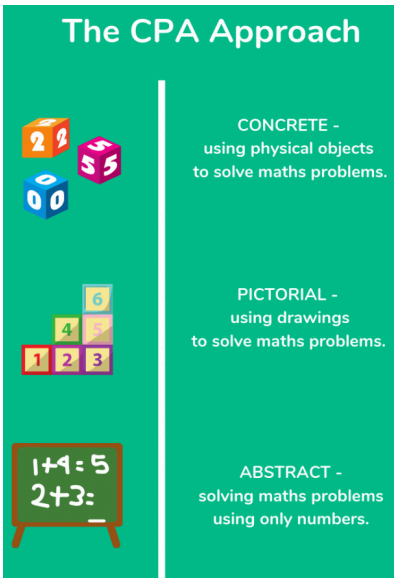
- A short, daily morning maths session will take place during registration or at the start of each maths lesson for all KS1 and KS2 children to consolidate the calculation methods and reinforce concepts which have already been taught.
- A daily mathematics lesson of 55-60 minutes is taught in KS1 and KS2.
- KS1 and KS2 children are taught in sets. These usually comprise one single-year group set with only Y2, Y4 or Y6 children in, and two mixed age groups, for example, Y1/2, Y3/4, Y5/6. The organisation will vary from year to year and will depend upon the specific needs of the cohorts. This enables lower ability children in the mixed age groups to consolidate their learning and close any gaps, before moving on to their own year group objectives if this is appropriate. Children **must not be taught any objectives from the year group above** as this leads to gaps in their learning and apathy when they are taught this content in the following year.
- Children in Y1 and Y2 will practise their number facts outside of the maths lesson every day for 10 -15 minutes, following the Mastering Number Programme.
- Children in KS2 will practise their times tables outside of the maths lesson **at least 3 x per week for 15 minutes**. The children will use Times Table Rock Star as part of their homework, if they do not have access to a device at home, they can do this in the homework club.
- The skills acquired in the maths lesson are applied across the curriculum. This will be evident in the medium term overviews for each phase.
- Assessment for learning throughout the session which may involve working with the whole class to refer back to Learning Objective and/or Steps to Success, address misconceptions, identify progress, summarise key facts and ideas, clarify what needs to be remembered, to make links in other work and to discuss next steps in learning.

Teaching Strategies

The Concrete, Pictorial, Abstract Approach

Objects, pictures, words, numbers and symbols are everywhere. The mastery approach incorporates all of these to help children explore and demonstrate mathematical ideas, enrich their learning experience and deepen their understanding. Together, these elements help cement knowledge so children truly understand what they've learnt and can apply them to other, unfamiliar mathematical situations.

We believe children learn best by moving from **concrete** first-hand experience, through **pictorial/ diagrammatic representation** to secure **abstract** knowledge and understanding. This sequence is also known as **'Make It. Draw It. Write It.**' This approach should be used whenever a new concept is being introduced, whatever age the child, and should not be limited to the youngest children. Children should be encouraged to shift between the various stages as and when they need them, therefore practical equipment/diagrammatic models etc must always be available throughout the school.



Concrete – children have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.

Pictorial – children then build on this concrete approach by using pictorial representations, which can then be used to reason and solve problems.

Abstract – Once the foundations are firmly laid, children can move to an abstract approach using numbers and key concepts with confidence.

In order to provide the children with active and stimulating learning experiences, a variety of teaching and learning opportunities are adopted:-

- Children may work individually on a task, in pairs or in a small group, depending on the nature of the activity.
- Wherever possible, practical 'real' activities are used to introduce concepts and reinforce learning objectives.
- Opportunities to transfer skills learnt, to real situations, are used whenever possible.
- Activities are planned to encourage the full and active participation of all pupils.
- Teachers use carefully planned questions throughout the lesson in order to meet the needs of all abilities. Self-differentiation is used regularly in order for children to challenge themselves.
- A CPA approach is utilised in **all year groups**, all classes have access to a range of mathematical manipulatives to support learning and understanding. A CPA calculation is followed by all year groups.
- Teachers place a strong emphasis on the correct use of mathematical language; this is supported by key vocabulary being displayed. Stem sentences are used and modelled during whole class input and are displayed on working walls.
- Teachers value pupils' oral contributions and create an ethos in which all children feel they can contribute.
- Throughout the school, children learn number facts and times tables using books, video clips and songs daily, alongside resources such as NumBots and TTRS. Class displays are used to encourage children to learn and recall rapidly facts which will support their maths learning. (TTRS leader board/ guitar display in KS2.)
- Reasoning and problem solving skills are taught explicitly by teachers as part of maths lessons in order to model the use of correct mathematical vocabulary and written reasoning.

Learning

EYFS

Number fluency is continually developed within early years: our Mathematical curriculum covers number, recognising numerical patterns and shape, space and measures. At this stage, songs, rhymes, stories and games ensure mathematical learning is appealing, engaging and playful. We aim for our children to be able to experience high levels of involvement and engagement in their mathematical learning. Therefore, mathematical learning is planned around following the children's interests and individual needs.

Children in Nursery and Reception participate in daily maths sessions and are given time to explore mathematical concepts, test ideas, develop their understanding, mathematical vocabulary and practise taught skills through play. Through well planned activities matched to children's interests, pupils in EYFS can immerse themselves in their learning. This helps embed the concepts they are learning. During independent learning time, children can explore number, shape, space and measures through continuous provision. Children are encouraged to use their mathematical understanding and skills to solve real-life problems and practitioners are trained to identify and extend opportunities to foster this. Maths activities in the Early Years can be directed or can follow children's interests.

The children are given plenty of time to make mathematical connections and activities are repeated, to ensure a deep level of understanding and learning. This repetition of activities takes place in a variety of contexts throughout the day to ensure children are consolidating key skills in a variety of ways e.g. at snack time 'I think Laurence has more crackers than you? How can we share these out?' or 'there are 5 of you, but there aren't enough chairs? What can we do?' This use of real world problem solving provides opportunities that are relevant and of interest to our children.

Maths can be found in all areas of the provision and children experience it in a purposeful and meaningful context within their play and daily routines. Equal importance is placed on indoor and outdoor learning opportunities. We provide many opportunities for mathematical learning in the outdoor spaces, in addition to those offered inside the classroom. This appeals to all children and the different ways they prefer to learn (multiple intelligences- kinaesthetic, visual-spatial, linguistic-verbal, musical etc). Outdoor learning is an integral part of learning across all areas of EYFS and there are endless opportunities for mathematics to take place here. We aim to promote- using the natural and local environment to support 'hands-on' mathematical development.

KS1 and KS2

In order to meet our aims, we believe that children must have exposure to a broad maths curriculum covering the 8 key areas set out by the National Curriculum:

Place Value
Number (+ - x ÷)
Fractions
Measures
Geometry
Statistics
Algebra (Year 6 Only)
Ratio and Proportion (Year 6 Only)

Whilst learning the fluency of number is essential, we believe that the learning must provide plenty of opportunities for children to explain their mathematical thinking and reasoning through: an encouragement to use practical resources, to create diagrams, to talk through thinking and to show their working out. Opportunities for application and problem solving are also essential to the children's learning.

Curriculum Planning

Long Term Planning

Teachers will use the White Rose Mixed Age Maths Schemes of Learning from R to Y6. The F1 curriculum is based on Birth to 5 and Development Matters and underpins the curriculum taught in F2.

All mathematical topics will be taught in blocks so that children can master each mathematical concept and apply it across a range of contexts. These may need to be adapted in light of school closures, depending on any gaps in learning or topics which were missed or covered during home learning.

Medium Term Planning

Small increments of learning are fundamental to a mastery approach. As is "over-teaching" core concepts such as number and place value, the four operations and times tables.

Teachers will base their planning on the small steps outlined by the White Rose Maths Schemes of Learning. The NCETM progression spines may also be used to support planning and provide useful guidance to support staff CPD on how to teach the small steps. The emphasis is to develop a sequence of teaching and learning that encompasses the cycle of assess, plan, teach, practise, apply, and review through every unit.

A strong emphasis on Using and Applying, including reasoning in mathematics is embedded within the curriculum. Additional lessons will need to be built in to teach reasoning and problem solving skills, enabling the children to apply their knowledge and understanding of the mathematical concepts taught.

A large proportion of time should be spent reinforcing number to build competency and fluency. Number is at the heart of any primary mastery scheme of learning, with more time devoted to this than other areas of mathematics. It is important that children secure these key foundations of maths before being introduced to more difficult concepts. This increased focus on number will allow children to explore the concepts in more detail and secure a deeper understanding. Key number skills are fed through the rest of the curriculum so that children become increasingly fluent.

The ready-to-progress criteria outline the most important conceptual knowledge and understanding that pupils need as they progress from Year 1 to Year 6. These important concepts provide a coherent, linked framework to support pupils' mastery of the primary mathematics curriculum.

The 'ready to progress' objectives from the previous year group should be assessed prior to moving on to the current year group objective. This will be achieved through formative assessment throughout the lesson. The DfE document "Teaching Mathematics in Primary Schools" https://www.gov.uk/government/publications/teaching-mathematics-in-primary-schools will support this process. It identifies priority areas of the primary maths National Curriculum that form the essential building blocks necessary for pupils to progress smoothly from Year 1 to Year 6. For each

of these areas, the document also identifies what it calls 'ready-to-progress criteria' which are the concepts children need to master before they progress to the next year group. The White Rose planning resources are able to support as they have identified where teachers might want to spend longer on topics to secure understanding and also suggest any content that children may have missed last year.

Cross-curricular mathematics links are planned for using the topic medium term plan. In light of recent school closures, where applicable missed learning will be taught through the wider curriculum, including, geometry, measures, and statistics.

Ongoing plans are used on a week-by-week basis and reviewed daily as necessary. These are developed as needed, taking into consideration the needs of our children. Many fundamental learning objectives will be covered more than once during the year to build up knowledge as part of the 'Making it stick approach'.

Time has been set aside during Spring and Summer terms to react to the knowledge 'gaps' highlighted from the White Rose Maths end-of-topic mini-assessments or from the Test Base mid-point or end-of-year tests. Teachers will need to analyse the results of the children they teach and plan accordingly. It is expected that by the end of each term every class/ set in the year group will have covered and completed the learning objectives on the Curriculum Overview.

Planning

The key questions when planning a lesson are 'What are the children learning?'and 'How can I help them to understand this concept?' rather than 'Which activities can I set the children to do?' As such, it is essential that Maths lessons are planned with thought.

A mathematical concept or skill has been mastered when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.

Assessing Prior Learning
"The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly." Ausubel (1968)
Teachers should assess what the children already know and identify misconceptions prior to planning a unit of work and use this to inform their planning. This does not have to be lengthy tests at the start of every topic, it can be using information from testing already carried out, or from a series of key questions given at the beginning of the new topic.

Learning Objectives
Learning objectives are often multi-faceted and will need to be taught over a number of days. The learning objective (s) should be broken down into its constituent parts and taught progressively over a series of lessons, using the White Rose Small Steps to guide progression. Each lesson should have a precise learning objective focussing on the specific step that the children need to learn, for example, To add two 2-digit numbers by exchanging using base 10

Misconceptions and Common Errors
Identifying common misconceptions is important so that we can plan opportunities to address errors before they arise. Teachers not only have to address misconceptions but also understand

why children may persist with errors. Potential misconceptions will inform the main teaching points of the lesson and a range of strategies can be used to support children to overcome them; addressing through reasoning questions; spotting the mistake in this calculation; providing a scaffold or model; explicit teaching of the 'sticky step' in the calculation; challenge through questioning; and using models and visual representations.

Activate Prior Knowledge

Activating prior knowledge allows and helps the children to make connections to the new information. By using what children already know, it helps the teacher assist children with the learning process because it gives him/her an idea of what children know and what they still need to learn. This also provides the opportunity to assess that the prior knowledge is secure before building on it.

Reasoning Starter

All lessons should start with a thought-provoking question that will create opportunities for children to reason, discuss, explain and make connections between their mathematical understanding. The question must be related to the learning objective and/or based on a potential misconception presented by the objective.

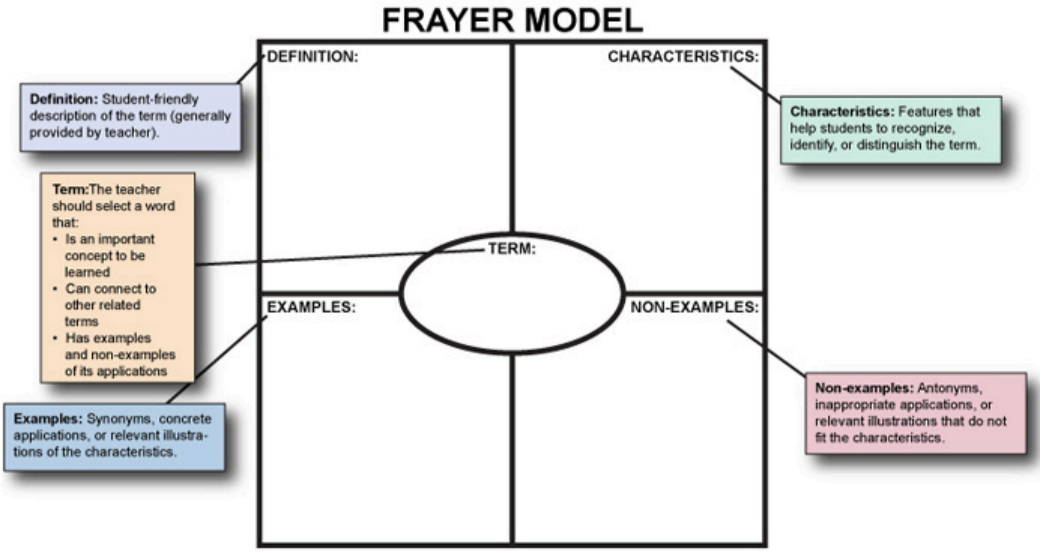
For example:

- What's the same? What's different? 5 x 7 = 35, 50 x 7=350
- True or False? 48+ 48= 816
- Always, Sometimes, Never? When two straight lines cross, there will be 4 right angles made.
- Spot the error: 147 + 147 = 2814
- Convince me: 3 x 4 = 4 x 3

The rationale for the starter question is twofold; firstly, it is an early opportunity for AfL and secondly, it promotes mathematical discussion between children of differing ability levels. The question should be the basis for the lesson's learning. Following this, there must be opportunities for paired or group learning before the children work independently in books.

Vocabulary

Understanding vocabulary is a major barrier for many children. Teaching and learning the language of mathematics is vital for the development of mathematical proficiency. Vocabulary related to the lesson should be identified in planning and taught/ recapped during the lesson using the Vocabulary Progression Document. Graphic organisers, such as the Vocabulary Frayer model, are extremely useful to support the children's understanding, the use of examples and non-examples can be very powerful. The 'The Ultimate Maths Vocabulary Activity Guide' produced by Third Space Learning has a range of activities, games and ideas to teach vocabulary effectively.



Sentence Frames/ Language Structures
A stem sentence includes accurate mathematical vocabulary in a highly structured sentence that provides pupils with a way to communicate their ideas with mathematical precision as well as clarity.

Stem sentences can be used to:

- Express a key concept
- Generalise a key concept
- Provide a template for discussions or explanations

Each time learners repeat a stem sentence correctly, it helps embed the concept.

For example, if a pupil is asked what the value of the digits in 24 are and they say, '24 has 2 tens and 4 ones', they are able to think aloud with mathematical precision and clarity. They are also able to embed the concept that 24 is the same as 2 tens and 4 ones (compared to an answer of simply '2 tens and 4 ones'). By encouraging pupils to say the whole sentence, they also reiterate the question and answer to others.

<u>Expressing a key concept</u>
Stem sentences that describe a key concept generally include missing parts to be completed. For example, '(number) is greater than (number).' This simple sentence can be populated in different ways in different situations, such as '17 is greater than 7' or '8.21 is greater than 1.32.'

This sentence structure helps pupils to scaffold their thinking when providing an answer to a question stem. It also helps them to focus on the maths involved, not on how to explain their idea (we have all had that moment of knowing the answer to a question until we are asked to say it out loud and our minds turn blank).

<u>Generalising a key concept</u>
Stem sentences that are used to describe a generalisation are usually complete sentences. For example, 'There are ten tens in one hundred' or 'Consecutive odd numbers always have a difference of two.' This type of stem sentence clarifies a mathematical concept and does not change.

If a pupil is struggling to understand a new concept, this type of stem sentence can be used to generalise the learning. Generalisation stem sentences are very useful when embedding concepts or recapping prior learning before building on them. Stem sentences from previous year groups, topics or lessons may be relevant to use in future lessons to recap concepts.

Structuring ideas and explanations

The final type of stem sentence is used to generally help structure ideas. These can be used in a range of lessons and are not maths specific. They usually include sentence starters and 'because' to draw out an explanation.

For example, 'I think the answer is… because…' or 'I know… because…'

This type of sentence starter can be used in any lesson to draw out the pupil's thought process when finding an answer. By using this type of stem sentence, learners are forced to articulate their ideas clearly, which can show if they have a surface level of understanding or a higher-level understanding of the concept they are exploring.

All together now!

The different types of stem sentences can be used in conjunction with each other to give detailed answers that are rooted in mathematical understanding. For example, when answering 6 x 4, the pupil may use the following stem sentences to give the answer:

'To calculate 4 lots of (number), I can double (number) and double the answer'
'I know the answer is… because…'
'To calculate 4 lots of 6, I can double 6 and double the answer. I know the answer is 24 because 6 doubled is 12 and 12 doubled is 24.'

Modelling

Explicit, systematic instruction is an effective way to teach maths concepts. Modelling the steps to success for the process demonstrates to the children exactly what to do and why. As the teacher moves through each step, they verbalise their expert thinking. This can be done to model the use of manipulatives and representations, or when teaching abstract methods. The steps need to be identified in planning to ensure modelling is clear and precise. Language and sentence structures can be added in the vocabulary section to support this.

The steps to success should be succinct and ideally contain no more than 6 steps to enable the children to remember them. Any new or particularly sticky steps can be highlighted using colour. An example would be:

To add two 2 digit numbers by exchanging using base 10

- Make both numbers
- Add the ones
- If there are more than 9 ones, exchange for a ten stick
- Add the tens
- Count the tens and ones
- Write the answer

These should be displayed on working walls alongside an appropriate worked model for the children to refer to during the lesson.

Paired and Group Learning

This should be centred around Active Learning Structures and, where necessary, involve practical activities, using resources, which promote mathematical discussion, with the more able children generally supporting those less confident. This provides another opportunity for AfL and targeted teaching.

Differentiation

With the whole class teaching model presented by the maths mastery approach, differentiation is critical when teaching the same topic to a class with different levels of attainment. For more advanced learners, challenge can be achieved by proving their answers or explaining a method that they have used, or thinking of an alternative method to solve the above problem as they progress towards greater depth in maths. For struggling learners, they may approach the above problem by counting the number of remaining balloons or using maths manipulatives like base ten.

Characteristics of teaching for mastery in maths means:

- An expectation that all pupils can and will achieve.
- The large majority of pupils progress through the curriculum content at the same pace. Differentiation emphasises deep knowledge and individual support/intervention.
- Teaching is underpinned by methodical curriculum design, with units of work that focus in depth on key topics. Lessons and resources are crafted carefully to foster deep conceptual and procedural knowledge.
- Practice and consolidation play a central role. Well-designed variation builds proficiency and understanding of underlying mathematical concepts in tandem.
- Teachers use precise questioning to check conceptual and procedural knowledge. They assess in lessons to identify who requires intervention so that all pupils keep up.

Differentiation strategies to try in maths

Differentiation in the classroom should focus on how pupils can be helped to understand new concepts and techniques. Our progression documents contain different sections which include a range of tasks and activities that will enable the needs of most children to be met effectively, without the need for separate worksheets which may limit the children's opportunities to progress. Different activities or worksheets may be needed to meet the needs of specific children whose needs vary greatly from the rest of the class. Catering for the different needs of the children in your class can be achieved in a number of ways, such as:

- Task/activity – different sorts of tasks: visual, hands-on, and auditory can all play a part in helping a learner to access the topic
- Outcome – what their end product will be, e.g. a model, a picture, written explanation
- Amount and rate of work completed
- Questioning
- Expectation – how far you expect children to go in an exploration/investigation and what you expect them to learn/conclude
- Resource – e.g. some may use equipment, other may use pictorial images
- Adult support
- Peer support – maths partners

Differentiation strategies work in some situations, but not in others. It is not always possible or appropriate to differentiate by changing e.g. the range of numbers used in an activity but sometimes this is the appropriate step to take.

Progression Documents

The Progression Document must have the learning objective clearly displayed at the top. The learning objective must be referred to so the children are explicitly aware of what they are learning. They should include a range of activities, including; fluency, varied fluency, reasoning, and problem-solving tasks.

Fluency and Varied Fluency

Fluency in maths is about developing number sense and being able to use the most appropriate method for the task at hand; to be able to apply a skill to multiple contexts. It includes being able to recall and use concepts, knowledge and skills, so that these can be drawn upon and applied as needed, such as the relationships between numbers (including number bonds and multiplication tables for example). Children need time to rehearse and secure the essential knowledge, such as number bonds or multiplication tables until it is so secure that it can be recalled with automaticity (and so does not require much working memory space).

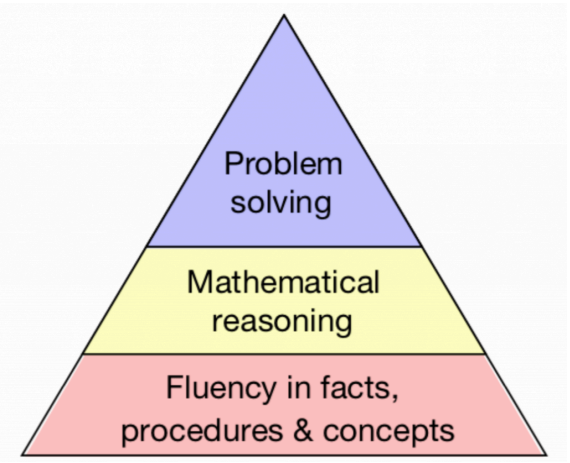
The basics of mathematical fluency involve knowing key mathematical facts and being able to recall them quickly and accurately. Fluency in maths works through intelligent practice (rather than just mechanical repetition). But true fluency in maths means we teach the content using a range of representations, to ensure that all pupils understand and have sufficient time to practise what is taught. Once a child has grasped a mathematical concept, the idea is that they are exposed to varied fluency activities which develop their understanding.

Reasoning

Reasoning in maths is the process of applying logical thinking to a mathematical problem in order to work out the correct strategy for a given question, and using this method to develop and describe a solution.

Problem Solving

Problem solving is not necessarily just about answering word problems in maths. If a child already has a readily available method to solve this sort of problem, problem-solving has not occurred. Problem-solving in maths is finding a way to apply knowledge and skills you have to answer unfamiliar types of problems.



Progression documents may look slightly different across a block of work. In the early stages of learning a new concept, fluency should take up the majority of lesson time to ensure that this is securely embedded to enable the children to apply this to reasoning and problem-solving. Once the concept is securely embedded and the children are fluent, progression documents will include more reasoning and problem-solving challenges linked to the concept.

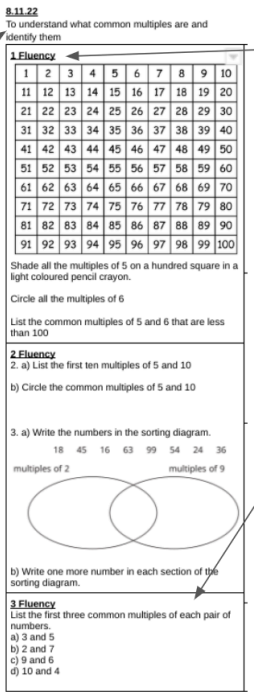
Some children will complete more fluency activities before moving on to reasoning and problem-solving challenges, Others will complete a limited amount of fluency activities before moving on, it is entirely based on the needs of individual children. The children should be able to decide how much fluency they complete before moving on, some will need guidance from an adult to do this effectively.

Here is an example of what a progression document may look like.

Date indicates when this learning took place

Learning objective is specific and taken from the lesson plan. It is shared with the children so they are explicitly aware of what they are learning and matches the small step or NC statement being taught.

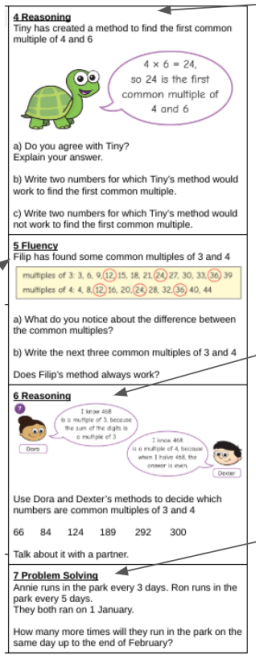
Progression documents are laid out vertically and stuck into books on the left hand side of their page/ This enables the children to write at the side of the tasks. Any marking and feedback can be added at the side of the question and the children's responses.



Fluency & Varied Fluency
The key skills children must be able to understand to be fluent with the learning objective. The first fluency tasks must support lower ability children to work with some independence. This may be reinforcing the previous year group objective, involve the children using practical equipment/ tasks or drawings to support understanding.

Once a child has grasped a mathematical concept, the fluency tasks become progressively more challenging and questions are presented using a variety of representations and contexts, exposing children to varied fluency activities which develop their understanding.

HA children may not need to complete the first fluency tasks and may start at a different point on the progression document.



Reasoning
Reasoning is the bridge between fluency and problem solving. It allows pupils to use the fluency to accurately carry out problem solving.
Reasoning tasks encourage children to apply logical thinking to a mathematical problem in order to work out the correct strategy for a given question, and using this method to develop and describe a solution. They may tackle common misconceptions linked to the LO and require children to explain errors made. All children should have access reasoning challenges in their learning. The first reasoning challenge should be accessible to all learners. Sentence stems may be added to support the children with their explanations.

Problem Solving
Problem solving is not necessarily just about answering word problems in maths. If a child already has a readily available method to solve this sort of problem, problem-solving has not occurred. Problem-solving in maths is finding a way to apply knowledge and skills you have to answer unfamiliar types of problems.

How does assessment fit into planning and the activities taking place in the classroom?

There are four levels of assessment: Below, Working Towards, Expected and Greater Depth

There should be clear differentiation in outcomes for each of these levels and therefore the required level of scaffolding to access the common learning objective. These outcomes should inform the activities planned. Children's starting points on the progression documents may be different. They should be encouraged to select their own starting point, though some children will need support with this. The children assessed at working at a greater depth may not need the fluency activities and may require more challenges at the application and greater depth level. Progression documents must include

To ensure that learning objectives are planned with assessment in mind, it is essential that teachers' subject knowledge of progression is demonstrated on the progression document.

- Children assessed as working at **'Below'** the age-related expectations should have differentiated activities generated for them based on an equivalent year group objective.
- Children assessed at **Working Towards**, will require a range of interventions, additional support and scaffolding before accessing the activities, if appropriate.
- Children assessed at **Expected** should be able to access and achieve the Fluency, Reasoning and Fluency Problems independently or with little support for the most part.
-

- Children assessed at **Greater Depth** should be able to access Fluency, Reasoning, and Fluency Problems independently and be able to explain their understanding confidently.

Examples of questions to be used on the Progression Documents can be found from a variety of planning documentation saved in the Maths curriculum folder. These include; NCETM Mastery, White Rose Maths and Focus Maths. There are a number of online resources that have good quality resources, such as Primary Stars Maths (KS1), White Rose Premium and Deepening Understanding,

Children should work in their books where possible, not on the Progression Document, this will enable them to show all their working out. In KS1 and FS, it may be more appropriate for the children to complete tasks on some of their progression documents to support their recording and organisation.

Marking

When using written marking strategies in maths lessons we aim to utilise the NCETM guidelines on what is most effective. 'Marking' is the process whereby a teacher looks at pupils' written work, examines it for errors, misconceptions and/or conceptual and procedural fluency, and then responds in some way, either in writing, speech or action. (NCETM Marking and Evidence guidance for Primary Mathematics April 2016)

It is important for teachers to distinguish between a pupil's simple slip and an error that reflects a lack of understanding.

- For slips, the teacher will often indicate where each slip occurs and encourage the pupil to correct them. When the teacher wants a pupil to correct a slip they will indicate this by making a mark with a green dot or pink highlighter.
- Where errors demonstrate a lack of understanding, the teacher may decide to take alternative courses of action. For instance, the teacher may: withdraw a small group during the lesson to address the issue; arrange same-day interventions; or address the misconception as a whole class during the next lesson. It is essential that marking picks up and addresses all misconceptions.

Ideally, marking should take place in the classroom to enable misconceptions to be quickly identified before they become embedded. Teachers should use verbal positive praise comments or offer written intervention advice when appropriate. For children in KS1 and FS, verbal feedback and intervention at the point of learning are more appropriate. Where the teacher or teaching assistant has intervened, this should be clearly identified. This could be a few words reminding them to check/ do … or a modelled example to support a calculation, this is dependent upon the concept the child is learning.

Teachers should use their professional judgement when deciding if written feedback is likely to correct a particular misconception or whether 'live' feedback will be a better course of action. It will not be an expectation that next-steps or targets be written into pupils' books. The next lesson will be designed to take account of the next-steps.

Evidence shows (Black and Wiliam 1998) that pupils benefit from marking their own work. Part of this responsibility is to identify for themselves the facts, strategies and concepts they know well

and those which they find harder and need to continue to work on. However, the teacher will always review any marking done by the children to ensure its accuracy.

It is good practice to highlight the activities where the child has been successful in green, and therefore the assessment point of work on the Progression Document. If the child has demonstrated a secure understanding of the learning objective , it should be highlighted in green.

Teaching Number Facts

What are number facts?
Number facts are early stage addition, subtraction, multiplication and division calculations that children should be able to recall easily and off by heart. Every child, from Year 1 up to Year 6 and beyond, needs to be able to instantly recall key number facts as this is an important thing to be able to do in maths.

Why do children need number facts?
Quite simply the reason for all children to know the number facts for their age, is it just makes it easier for them to learn new information and strategies in maths. Children's working memories have only a finite capacity, meaning the more they can commit to their long term memory, the better.

If they can learn their number facts to a state of 'automaticity' i.e. they can automatically recall them within 5 seconds without counting or 'thinking', it frees up their brain capacity to learn the new concept that is being taught. By making sure children know their times tables, once they start to learn about fractions, they can focus all their attention on working out the strategy needed, rather than on working out the answer.

Addition and Subtraction Number Facts

Year 1 - Develop fluency in addition and subtraction facts within 10. (RTP 1NF–1)
It is very important for pupils to be able to add and subtract within 10, fluently, by the end of year 1. This should be taught and practised until pupils move beyond counting forwards or backwards in ones, to more efficient strategies and eventually to automatic
recall of these number facts. This is necessary before pupils move on to additive calculation with larger numbers.

The 66 addition facts within 10 are shown on the grid below. The number of addition facts to be learnt is reduced when commutativity is applied and pupils recognise that 3 + 2, for example, is the same as 2 + 3. Pupils must also have automatic recall of the corresponding subtraction facts, for example 5 – 3 and 5 – 2.

Pupils should learn to compose and partition numbers within 10 before moving on to formal addition and subtraction.
Pupils are likely to already have memorised some number bonds within 10 (for example, number bonds to 5, to 10 and some doubles facts). However, at this stage, most pupils won't remember all of their number facts by rote learning, so they should also be taught to derive additive facts within 10 from previously memorised facts or knowledge.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5	5+0	5+1	5+2	5+3	5+4	5+5					
6	6+0	6+1	6+2	6+3	6+4						
7	7+0	7+1	7+2	7+3							
8	8+0	8+1	8+2								
9	9+0	9+1									
10	10+0										

Year 2 - Fluently add and subtract within 10. (RTP 2NF–1)
In year 1, pupils should have learnt to add and subtract fluently within 10..
However, pupils may not still be fluent by the beginning of year 2, so this fluency should now be secured and maintained. Pupils should practise additive calculation within 10 until they have automatic recall of the additive facts. Fluency in these facts is required for pupils to succeed with addition and subtraction across 10 and for additive calculation with larger numbers.

The 66 addition facts within 10 are shown on the grid above. The number of addition facts to be learnt is reduced when commutativity is applied and pupils recognise that 3 + 2, for example, is the same as 2 + 3. Pupils must also have automatic recall of the corresponding subtraction facts, for example 5 – 3 and 5 – 2.

Children in Year 2 need to be able to add and subtract within 10 without counting forwards or backwards in ones on their fingers, on a number line or in their heads. Pupils need to be able to automatically recall the facts. Teachers should assess pupils in small groups – simply providing the correct answers to calculations in a written test does not demonstrate that a pupil has met the criterion.

Year 3 - Fluently add and subtract within and across 10 (RTP 3NF–1)
Pupils should already have automatic recall of addition and subtraction facts within 10, from year 1. In year 2, pupils learnt strategies for addition and subtraction across 10. However, year 3 pupils are likely to need further practice, and reminders of the strategies, to develop sufficient fluency. Pupils should practise until they achieve automaticity in the mental application of these strategies. Without this practice many pupils are likely to still be reliant on counting on their fingers to solve within-column calculations in columnar addition and subtraction.

The full set of addition calculations that pupils need for columnar addition are shown on the next page. The number of facts to be learnt is reduced when commutativity is applied and pupils recognise that 7+5, for example, is the same as 5+7. Automaticity in subtraction facts should also be developed through the application of the relationship between addition and subtraction, for example, pupils should recognise that if 7+5 = 12 then 12 – 5 = 7 .

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

Multiplication and Division Number Facts
Much of the mathematics curriculum in Upper Key Stage 2 is built upon a good understanding of multiplication and division and recall of the multiplication tables. Not having facts at their fingertips or fast strategies to get them will slow down the bigger calculations they are trying to solve and place additional pressure on working memory when problem-solving, as they are adding in additional steps to work out multiplication facts rather than recalling them.

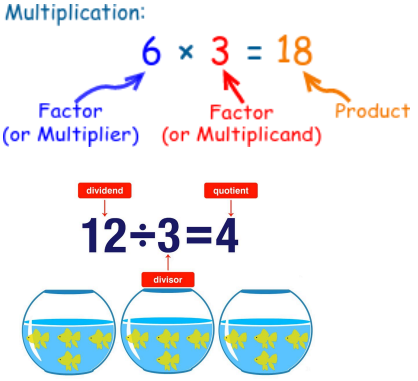
Our aim is for all children to be able to instantly recall the multiplication facts to 12 x 12 by the end of Year 4 in readiness for UKS2. We are aiming to go beyond merely recalling multiplication facts by teaching fluency and conceptual understanding in tandem with each other.

Whole School Teaching Strategy
The broad shape of the approach used is three-fold.

- In each class, a whole half term is devoted to a new times table as it takes 8 weeks of repetition to secure automatic thinking.
- Within that half term, three whole lessons are devoted to exploring the patterns and connections within the new times table.
- Three to five times a week in every class there's a 5 to 10 minute 'retrieval practice' session, including one or more of the following: games, counting-stick work, step counting using manipulatives, chanting and technology-based, quick-reaction exercises.

Key teaching components:

- Each new times table must be linked to the real world at the outset (what comes in 2s, 3s, 4s, etc).
- Multiplications are presented consistently across school. For example, the 6 times table appears as 1 × 6, 2 × 6, 3 × 6... not 6 × 1, 6 × 2, 6 × 3...
- The language associated with the teaching of multiplication and division should be used consistently across the whole school:



multiplicand, multiplier and product; dividend, divisor, quotient and remainder.

- The order that which each new times table is introduced is followed by all classes and is outlined below, with opportunities built in to revise and make links to times tables that they know (the one in brackets). This is an interim overview which will be superseded in two years when all children should have automaticity by the end of Year 4. In the academic year 2021-2023, Years 4, 5 and 6 will all follow the programme set out for Y5. From 2023, year groups will follow as outlined below. From 2024, the Year 5/6 sessions will then be taught in interventions for those children who need it.

YEAR	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Experience counting forwards and backwards in 1s, 2s, 5s and 10s					
Year 2			1x	(1x) 2x	5x	(5x) 10x
Year 3	(2x) 4x	(4x) 8x	3x	(3x) 6x	(6x) 12x	revision
Year 4	9x	7x	11x	squares	revision	MTC
Year 5	(2x) 4x 8x	5x squares	3x 6x	12x 9x	7x 11x	revision
Year 6	(2x) 4x 8x	3x 6x 12x	9x 7x 11x	revision	revision	revision

Prerequisites for multiplication:
Before children embark on learning times tables, there are several things that they should know about multiplication:

- unitizing (dividing into separate parts)
- understanding equal and unequal groups
- combining equal groups
- understanding the relationship between repeated addition and the multiplication symbol.

These are key concepts that are taught and embedded in EYFS and KS1 mathematics curriculum.

Dedicated whole class maths lessons

Approximately three whole class sessions each half term should be dedicated to teaching each new times table. This is important for developing connections, exploring patterns and creating a deeper understanding of multiplicative reasoning focussing on the new times table over the course of the term.

Step 1 - When you introduce a new times table systematically build it together with the children around the facts they know and have met before.

Step 2 - Make clear conceptual links to the real world; 'What comes in …?' Encourage the children to find and draw a range of visual representations of the multiplicand. (Eg quad bike, family of four, quadrilaterals, dice/ card displaying the multiplicand etc)

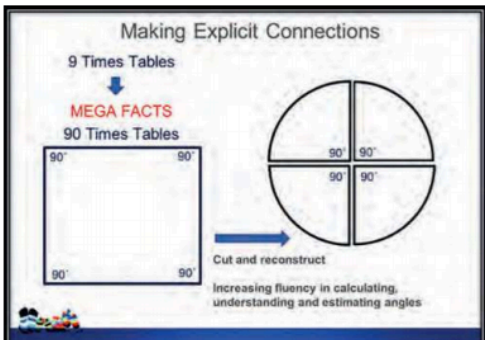
Step 3 - make a display of the focus timetable for that half-term. Things to include:

- numicon

  - array for multiplication table - peg boards are useful for this
- hundred square set out in rows of the multiplier
- practical representation of the times table facts
- visual cues and prompts
- bar models
- number blocks
- provocative questions
- problems for the children to solve (not just word problems)
- exploring real-life patterns etc

Step 4 - When you introduce a new times table, use the CPA approach, consider which is the most powerful representation to show the properties and laws of multiplication. Arrays are crucial in this. Pegboards or double-sided counters are powerful tools in developing a deeper understanding of multiplication, eg representing 7x5 = (5x5) + (2x5) etc, making links to other times tables, eg 5x6 = (5x3) + (5x3) and demonstrating how they can calculate unknown multiplication facts using what they know, eg 9x5 = (10x5) - 5

Step 5 - Take time to explore the patterns within the new times table and how each times table relates to several other times tables.



Step 6 - Make explicit connections to other mathematical concepts, such as money. We want children not only to recall that 7 × 4 = 28, but more importantly, to know commutative and inverse (division) facts, fact families (4 x 5 = 20, 5 x 4 = 20, 20 ÷ 5 = 4, 20 ÷ 4 = 5) mini and mega facts, e.g. 70 × 4 = 280 and 0.7 × 4 = 2.8; the distributive law, e.g. (5 × 4) + (2 × 4) = 7 × 4; doubling and halving facts, and also know that 4 × 7 is the same as (5 × 7) – 7

Regular Retrieval Practice

Retrieval sessions should take place 3-5 times per week and should last for between 10 and 15 minutes. Some of these could be done at the start of the maths lesson, or when the children are lining up for lunch/ assembly.
In these sessions, there is an emphasis on saying (and hearing) the sound pattern (saying the multiplication number sentence) or the phase which can lead to verbal prediction and patterning. Practice should also include conceptual support; using manipulative x table facts, exploring patterns and structures, and representing times table facts. Rapid recall of times table facts through games, quizzes, chanting, IT-based resources such as TTRS, counting in multiples using a counting stick or an active learning structure are also very effective. Keep it fun and focused.

Counting and tracking

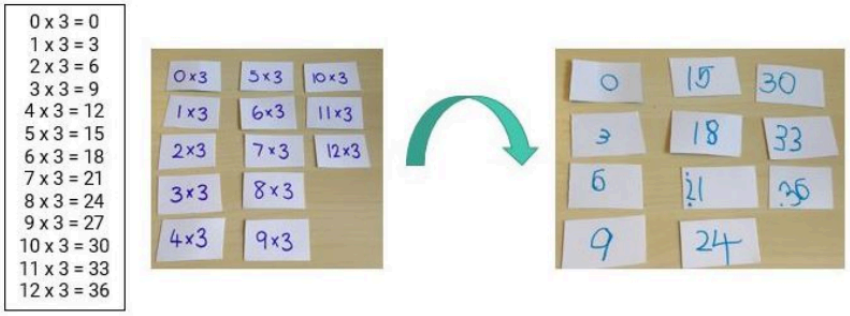
Counting and tracking the number of groups on fingers is really important to help children understand one lot more or less as well as to build up a familiar pattern of multiples ready to learn facts. Avoid counting in multiples at the beginning if you want to build a good understanding of relationships between facts. Children generally begin by counting every object in a row at the beginning of skip counting. Help this by encouraging children to ‘whisper’ numbers that are not a times table fact, touching each object and shouting the number of the object at the end of the rows. For example…

1, 2, **3**, 4, 5, **6**, 7, 8, **9**, 10, 11, **12**...

In this array, the child might point to each object starting top right, move along the row whispering 1, 2 and shouting 3, move to the next row whispering 4, 5 and shouting 6 etc. They repeat this on their fingers; tapping a finger and whispering 1, 2 and shouting 3. You could try with cubes on your fingers. Over time, encourage children to miss out the 'whisper numbers' and skip count more. Finger tracking at this stage is crucial to help children negotiate the number of groups. We can make it more efficient once children can skip count by asking… Do we need to count up from 0? If you can remember your 5th fact, could you count on from there?

Question practice

A good activity to do at this point (with arrays of small items still available) is to turn the facts into a set of cards with the 'question' on one side and the 'answer' on the back:



Once these cards have been made, there are lots of options for playing with them; first of all, in order to build some memory recall and then, once the child is starting to remember what is on the back, moving to play with them out of order to further secure the learning. The point here is about taking time to build confidence and develop memory. Repeated rehearsal should strengthen the memory so don't rush to reach the out of order and speed rounds.

Games with the cards

On your own, in a pair, with an adult...

- In order first, with the list still visible
- In order, without the list
- Starting with the product, give the fact
- Out of order – choose 'easiest' first
- Out of order – less choice of order
- Speed round

Ask questions such as, "Which facts do you think you already remember?" "Which facts do you think are harder to remember? Why is that?" "How can we remember them?" "How could you use other facts you do remember to help?" This helps children to take more ownership in the learning of facts they see as 'harder' to remember.

The role of the Maths Leader

The Maths Leader will provide leadership of mathematics across the school in order to develop high-quality teaching and learning and improve outcomes for all pupils.

Leadership and management

- Providing a strategic lead and direction for the subject;
- Ensuring that all subject-specific information, such as policies, information, objectives, etc., is kept up-to-date;
- Supporting and offering advice to colleagues on issues related to the subject;
- Leading staff meetings or other CPD activities in relation to the subject development;
- Producing a subject-specific scheme of work, ensuring progression;
- Working with other Subject Leaders to ensure that cross-curricular links are maximised;
- Improving the quality of teaching and learning over time;
- Monitoring progress in that subject area through data analysis, book looks, pupil interviews, lesson observations, learning walks and planning scrutiny;
- Keeping themselves up to date with developments in their subject area, including relevant reading / research, attending courses and network meetings.
- Providing efficient resource management and ensure they are used effectively;
- Identifying the subject's needs and prioritise them in the context of whole-school decision-making to ensure a broad and balanced curriculum;
- Preparing a comprehensive subject development plan, which outlines improvements required and how these will be addressed;
- Reporting to the subject Link Governor on a regular basis, either in person or via the subject leader report.
- Raising the profile of the curriculum area and ensuring that parents and the wider
- community have access to relevant information, including on the school website, via newsletters and through the use of Twitter;
- Creating and maintaining links with support, including local authority, other schools, subject-specific associations, etc.;
- Providing the point of contact for a 'deep dive' or other scrutiny of the subject;
- Ensuring assessment procedures are clear and systems (such as OTrack / Class Track) are maintained and are able to support their children's learning at home.

Assessment, Recording and Reporting

Assessment takes place at three connected levels: short-term, medium-term and long-term. These assessments are used to inform teaching in a continuous cycle of planning, teaching and assessment.

Formative Assessments

In EYFS, staff complete baselines against our checkpoints on entry to the unit. This identifies those children who may not have much previous experience or prior knowledge of key mathematical concepts. This is used to inform early interventions and planning to ensure that teaching and learning opportunities are appropriate and accessible to all. Termly assessments are also carried out against our checkpoints, to identify any gaps in learning and children who are not 'on track' to reach the expected level of development and intervene appropriately.

In KS1 and KS2, a pre-assessment test or task at the start of each topic or block ensures that teachers are able to accurately pinpoint gaps in children's knowledge and understanding and are able to plan lessons which address these gaps. As part of the ongoing teaching and learning

process, teachers will assess children's understanding, achievement and progress in mathematics. This is based on observation, questioning and the marking and evaluation of work. This will also enable appropriate same-day intervention, feedback to children and TA deployment for the following day.

At the end of each unit, the children are re-assessed focussing on the concepts they have covered and this is used to inform future planning and teacher assessment throughout the year. Teachers will regularly update O Track, assessing every pupil against the objectives from the National Curriculum. Progress against assessment statements will be carefully monitored, alongside progress in learning in children's books

At the end of each term class teachers in KS1 and KS2 will input a teacher assessment, based on the O Track objectives, daily/ weekly assessments and data from the end of unit assessments using the White Rose Maths assessments and the Test Base termly and end of year tests. The progress made and percentages of those children on- track to reach National Curriculum end-of-year targets will be analysed and discussed at termly data meetings.

Summative Assessments

Termly summative assessments are undertaken through a combination of teacher assessment and end-of-term assessments. In Years 2 to 6, previous SATs papers will be used to assess and review pupils' progress and attainment. Years 3, 4 and 5 will use the termlyTest Base assessments. Question level analysis will be carried out to identify gaps and used to inform focused interventions and future planning.

End-of-year summative assessments for Years 2, 3, 4 and 5 will be completed using the end of year Test Base assessments and formative assessment information, which will inform teacher assessment. In Year 2 and Year 6, statutory assessments will be undertaken in May, which will be used to inform teacher assessment. Information from summative assessments will then be used to inform parents of their child's progress and will be passed on to the next teacher to inform future planning.

Environment

It is important that both the whole school and classroom environment supports both the learning and teaching of mathematics. The school aims to provide a mathematically stimulating environment through the use of working walls to support learning and teaching in a lesson or series of lessons. Every classroom should have a range of practical equipment and resources suitable for the age and stage of the children, such as number lines, hundred squares, place value counters, double-sided counters, bundles of straws, dice, money, clocks, 2D and 3D shapes, maths frames, balance scales, mirrors, rulers, tape measures, protractors, fractions manipulatives, place value counters, place value charts and multiplication squares available for use with the whole class or individual work. Children are encouraged to access these independently.

Homework

We recognise the importance of making links between home and school and encourage parental involvement with the learning of mathematics. Homework provides opportunities for children

- to practise and consolidate their knowledge and recall of number facts;
- to practise and consolidate their skills and knowledge of mental arithmetic methods;
- to share their mathematical work with their family;

- to prepare for their future learning.

Children in Years 1-6 receive a short piece of mathematics homework each week/ fortnight. This will be differentiated and is focused on number fluency, including times tables and/or number bonds. TTRS should be used to support the children in learning their multiplication and division facts. For children who do not have access to an electronic device at home, class teachers must provide the opportunity in school for them to use TTRS.
More information is available in the Home Learning Policy.

Equal Opportunities

All pupils will have equal opportunity to reach their full potential across the mathematics curriculum regardless of their race, gender, ability, religion, race or cultural/ethnic background.
Equality at Hallgate School is about enabling all children to achieve their maximum potential as individuals and as members of society, and ensuring equality of opportunity and treatment for all pupils, members of our staff and the school community.
Our school ethos is to actively promote a warm, caring community where all are valued.
Please see our Equality Policy for more details.

Inclusion

The school's equal opportunities policy applies to the teaching of mathematics as to all other subjects.

Impact

The expectation is that the majority of pupils will move through programmes of study at broadly the same pace. However, decisions about when to progress will always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly will be challenged to broaden and deepen their learning. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on. All children are expected to succeed and make progress from their starting points.

Pupil Voice

Children use an increasing range of mathematical vocabulary with accuracy and can explain their thinking. Through discussion and feedback, children talk enthusiastically about their maths lessons and speak about how they enjoy learning in maths. Children show confidence and believe they can learn about a new maths area and apply the knowledge and skills they already have.

Knowledge

Children acquire mathematical knowledge. Children develop strong foundational skills and security with core aspects of maths. Pupils have automaticity in maths, underpinned by good understanding and number sense. Mathematical concepts or skills are mastered when a child can show them in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations. Children demonstrate quick recall of number facts and can apply this knowledge when solving related problems.

Skills

Children develop independence and show resilience when tackling problems. They have the flexibility and fluidity to move between different contexts and representations of maths. Children develop the ability to recognise relationships and make connections in maths lessons. Children use and apply their mathematical thinking inside and outside of school. They use their mathematical skills in cross-curricular areas. They develop broad and deep

Cultural Capital and SMSC

Young pupils show an emerging understanding of the need for maths beyond school. They begin to understand that maths is important for their futures. Children talk about maths in a positive way. Enjoyment of maths is celebrated and maths is spoken about positively. Children work both collaboratively and independently. Success in maths is celebrated and shared. Maths is linked to other curriculum areas and opportunities to make links to cultural influences are seized. Concepts of fairness, sharing and data collection are used and linked to real-life situations. Children share and look after the maths resources in the classroom. Children extend their learning through role play and other aspects of continuous provision. Adults support children to extend and deepen learning through high-quality interactions.