



MATHS AT MALVERN WELLS



Maths at Malvern Wells places the learning journey at the heart of all of our pupils. We believe that children should leave primary education as confident, resilient mathematicians with a deep conceptual understanding of the skills required to approach any Maths problem. We build children's aspirations as mathematicians by demonstrating possibilities for their future life and the rigour of our curriculum tries to support this aim. Our values underpin all that we do in Maths fostering courage, commitment, community and compassion. We understand the importance of communication and language and ensure this underpins our planning. This focus strengthens our pupils' ability to learn at a deeper level, allowing them to articulate their learning. Additionally, our curriculum allows for our pupils to demonstrate high quality thinking and to apply skills and knowledge confidently and competently.

Our mission is to enable all learners to enjoy and succeed in mathematics. We would like our learners to:

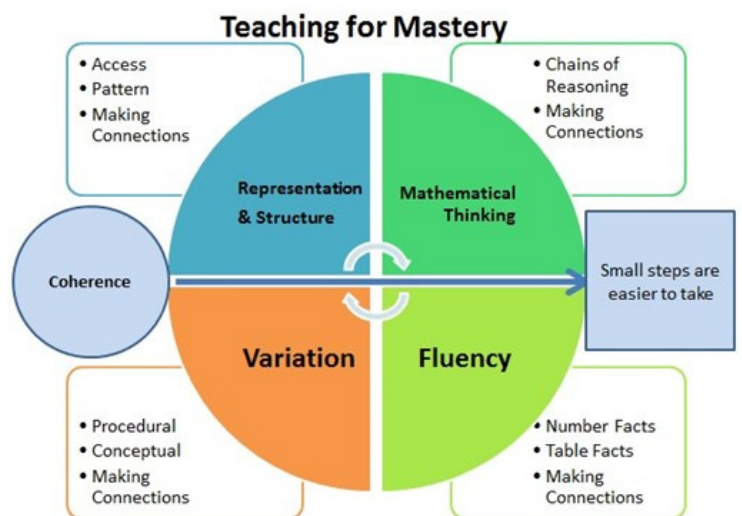
1. Calculate fluently and manipulate numbers.
2. Think logically, reason and solve problems in a range of contexts.
3. Confidently communicate using precise mathematical language while becoming mathematical thinkers.
4. Develop a positive attitude towards Maths and be able to use it effectively in real-life scenarios.

To ensure whole-school consistency and progression, Mathematics at Malvern C of E Primary School is planned and sequenced using White Rose Maths. This is fully aligned with the National Curriculum. Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time. Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems. Practise and consolidation play a central role with carefully designed variation which builds fluency and understanding of underlying mathematical concepts.



Mathematics is an interconnected subject in which pupils must be able to move fluidly between representations of mathematical ideas. Students should make rich connections across mathematical ideas to develop fluency, mathematical reasoning, and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The 5 Big Ideas that underpin mastery in mathematics are central to our approach.

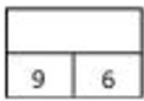


At Malvern Wells we have adopted a Mastery approach which enables pupils to acquire a deep, long-term, secure and adaptable understanding of the subject. The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths. Achieving mastery means acquiring a solid enough understanding of the Mathematics that's been taught to enable pupils to move on to more advanced material.

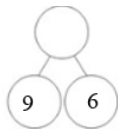
Teaching for Mastery is underpinned by four areas, these include:

- Representation and Structure
- Mathematical Thinking
- Variation
- Fluency

Representation and Structure focuses on how concepts in Mathematics are presented in different ways and forms for example when adding 2 numbers together it could be presented in many different ways:



Bar Model Representation



Part-Part Whole Model Representation

$$9 + 6 = \underline{\quad}$$

Number Sentence Representation

Nines ones add 6 ones is equal to $\underline{\quad}$
Place Value Representation

At Malvern Wells we believe that it is important to expose children to many different representations and structures. This will enable a child to demonstrate mastery in a particular area of Mathematics if they are able to apply this within a range of different situations.

Mathematical Thinking requires children to be able to work through problems systematically rather than through `trial and error`. Children should be able to look for patterns and relationships and make connections. Children are able to demonstrate their mathematical thinking by explaining their methods and thought process when solving a mathematical problem.

Fluency is split into two areas:

- Procedural fluency
- Conceptual fluency

Procedural fluency is the ability to apply procedures accurately, efficiently, and flexibly; to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognise when one strategy or procedure is more appropriate to apply than another.

Conceptual understanding is knowing the procedural steps to solving a problem and understanding why those algorithms and approaches work. This level of understanding has students reaching higher depths of knowledge because they are making connections from one skill to another.

Fluency relies on the quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of Mathematics.

Variation is also split into two areas like fluency:

- Procedural variation
- Conceptual variation

Procedural variation – This is a deliberate change in the type of examples used and questions set, to draw attention to certain features.

Conceptual variation – When a concept is presented in different ways, to show what a concept is, in all of its different forms.



Using the White Rose Maths materials, teachers will plan as necessary for the needs of their classes using a format that is personalised to the teacher. All classes have a daily 60-minute Mathematics lesson with the opportunity within the day to complete `Flashback 4`. Flashback 4 works alongside the White Rose Maths scheme to ensure that pupils have the opportunity to revisit previous learning through 4 daily questions, this gives children an opportunity to regularly revisit concepts taught earlier in the year, in essence helping knowledge to `stick`.

Alongside White Rose, additional resources are used to subsidise and help teachers provide activities for the children:

- Classroom Secrets
- Master the Curriculum
- Third Space Learning
- NRICH
- NCETM

At Malvern Wells we also acknowledge our own teachers' creativity, where resources and activities may be created solely by the teacher.

In all 60 minute lessons, learning objectives are displayed and discussed. The emphasis in lessons is to make teaching interactive and lively, to engage all children, encouraging them to talk about Mathematics. Difficult points and potential misconceptions are identified in advance and strategies to address them planned. Key questions are planned, to challenge thinking and develop learning for all pupils. Within the session children will be exposed to problems to solve, resulting in mathematical discussions about key ideas. Throughout, there should be a balance of teacher talk and pupil led discussion. Children will have the opportunity to use concrete resources to support their understanding of mathematical concepts as well as using pictorial methods.



| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | | | | | | |
|--------|-------------------------------------|--------|--------------------|----------------------------------|-------------------|-------------------|-----------------------------------|--------|-------------------------------------|---------|----------------------------------|---------------|
| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 |
| Autumn | Number: Place Value | | | Number: Addition and Subtraction | | | Measurement: Length and Perimeter | | Number: Multiplication and Division | | | |
| Spring | Number: Multiplication and Division | | | Measurement: Mass | | Number: Fractions | | | Number: Decimals | | | |
| Summer | Number: Decimals | | Measurement: Money | | Measurement: Time | | Statistics | | Geometry: Properties of Shapes | | Geometry: Position and Direction | |
| | | | | | | | | | | | | Consolidation |



Concrete, Pictorial and Abstract Learning:

Children engage with a wide and varied range of concrete manipulatives, pictorial representations and abstract methodologies within each session. Cohesive use of CPA is a fundamental part of mastery in mathematics for all learners, not just those pupils with SEND. Concrete and pictorial references scaffold and strengthen understanding and are widely used as a teaching and learning tool from Foundation Stage to Year 6.



Fluency, Reasoning and Problem Solving:

Every learning session includes the opportunity to develop fluency skills, construct chains of reasoning using relevant knowledge alongside relevant terminology and solve increasingly complex problems in a systematic and coherent way.

Mathematical Vocabulary:

Sessions include explicit reference to vital mathematical vocabulary and the use of stem sentences to support and encourage all children to communicate their ideas with mathematical precision and clarity. These sentence structures often express key conceptual ideas or generalities and provide a framework to embed conceptual knowledge and build understanding.

Fluent Recall

We are committed to ensuring that pupils secure their knowledge of Times Tables and Related Divisional Facts by the end of Year 4. Our pupils engage in regular low stakes testing through Times Tables Rock Stars to practice fluent recall



EYFS

In Reception the `Development Matters` document is used to develop and plan lessons around a selected objective. During daily, lass taught sessions, previous learning will be revisited and new concepts introduced. Children will learn through a mixture of adult led activities and child initiated activities both inside and outside of the classroom. Where possible links are made to other areas within the curriculum to make learning relevant and meaningful.

The two key ELG's for mathematics are:

1.Number: Number composition, subitising, recall of bonds to 5 and 10 and doubling

2.Numerical Pattern: Verbally count beyond 20, Compare quantities, explore and represent patterns

Teachers provide creative and engaging opportunities for children to ignite their curiosity and enthusiasm for the subject, while focusing on the three prime areas of: Communication and Language, Physical Development and PSED.

Activities and experiences are frequent and varied, and allow children to build on and apply understanding of Numbers to 10. Concrete manipulatives are a key focus within sessions, as is the use of pictorial representations including Tens Frames and Part/Whole Models.

Children are actively encouraged to use mathematical terminology within their understanding, with a focus on developing positive attitudes and interest in the subject.



Year 1 - Building our declarative knowledge

Fluency is one of the three aims for the 2013 national curriculum. It is also one of NCETM's '[Five Big Ideas of Teaching for Mastery](#)' where it's defined as "quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics".

In year one, we feel children need to learn the art of becoming fluent mathematicians before progressing on to the deeper thinking skills of reasoning and problem solving. It is for this reason, teachers will focus more on the learning of being fluent before looking to deepen understanding. We feel this approach helps children lay their own foundations before going on to try more enhanced mathematical questions.



At Malvern Wells we have three stages of fluency

1. Simple strategies

Initially, as a child gets to grips with a new skill, they can work out an answer using concrete resources or counting strategies. This will enable them to solve a problem accurately, but it's not the most efficient strategy.

2. Mental calculations

As learners become more proficient with new learning, they reach the second stage of fluency. Learners at this stage can work out an answer in their head. It still requires some thinking and effort as they develop reasoning strategies, but they're well on their way to becoming more efficient.

3. Achieving fluency

Finally, children reach the stage of 'I just knew it'. They can reliably produce accurate answers in an efficient way. This stage often involves using their knowledge flexibly; making connections so that the known can be used to work out the unknown.



At Malvern Wells, you can identify a fluent learner when they have a secure understanding of what they're doing and why they're doing it. Researcher Dr Susan Jo Russell thinks fluency is made up of three key parts: efficiency, accuracy, and flexibility.

- **Efficiency:** learners choose efficient strategies and don't get bogged down in too many steps
- **Accuracy:** learners are accurate in their workings, have great recall of facts and double check their answers
- **Flexibility:** learners understand that there are many ways to solve a problem

Fluency means that learners can do more than just memorise procedures. To be truly fluent, a child understands the meaning of the operations and their relationships to each other, they have a large knowledge bank of number facts, and a deep understanding of the base ten system. This approach will enable our children to let their own Mathematical lights shine bright allow our teachers to nurture for a brighter future.

Pupils record of work

All pupils have access to their own Mathematics book where they will record their learning. Children are taught a variety of methods for recording their work and are encouraged and helped to use the most appropriate and convenient method. Children are encouraged to use mental strategies and their own jottings before resorting to more formal written methods. Children's own jottings to support their work is encouraged throughout all year groups.

Marking

At Malvern Wells, we believe marking and feedback is essential to ensuring that children continue to make further progress. Work is marked against the learning objective, in line with the schools marking policy (see Marking and Feedback Policy for further information).

Within each Mathematics sessions children are provided with both oral and written feedback. Throughout Mathematics sessions children are provided with live feedback to address misconceptions, support the children's learning and extend learning further.

Next steps are provided in books when necessary to check understanding, children are encouraged to look back and check their work, as well as providing an opportunity for children to read and respond to marking.

At Malvern Wells, we believe same day intervention to address any misconceptions has enormous power in allowing the children to succeed. As reflective practitioners, teachers have the opportunities every afternoon to address any misconceptions which may be identified in that mornings lesson.

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





At Malvern Wells Primary School, the expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. We aim for each child to be confident in each yearly objective and develop their ability to use this knowledge to develop a greater depth understanding to solve varied fluency problems as well as problem solving and reasoning questions.

Some children can underperform in maths because they think they can't do it or are not naturally good at it. Our approach addresses these preconceptions by ensuring that all children experience challenge and success in maths by developing a growth mindset. Therefore, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly are challenged through rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material consolidate their understanding, including through additional practice, before moving on. Where necessary, earlier material should consolidate their understanding, including through additional practice, before moving on.

Formative Assessment:

Teachers carry out formative assessment through AfL in each session and feedback is given to children verbally, through self/peer assessment and through marking. Teachers then use this assessment to influence their planning. Children are rapidly identified as needing further challenge or additional support, and we ensure that this is provided in a timely manner.

Summative Assessments:

Children complete End of Block assessments at the start and end of each phase of learning. Results are used to further inform planning and allow for tailored interventions groups to take place to ensure the objectives are secured.

Our Assessment Calendar also includes 3 key dates for capturing progress and attainment against National Curriculum Objectives. Assessments are carried out in Autumn, Spring and Summer terms.

Effective analysis of our children's achievement and areas for development means we are able to deliver to targeted focus groups, provide interventions and boosters based upon the assessment to ensure all children are ready to move on.

We can use this assessment to evaluate the knowledge, skills and understanding that the children gain as they progress from Reception to Year 6. In addition, we can report upon whether or not:

Pupil fluency has improved.

Children can verbalise their thinking.

Children can respond in full sentences and reasoning.

Children can approach problems with a 'Can do!' attitude.

Pupil voice suggests a positive attitude to maths.

These factors help us to maintain high expectations and high standards in mathematics, with achievement at the end of KS2 in line with the national average.

