LIPSON VALE
PRIMARY SCHOOL

Teaching Mathematics

Our Approach to teaching mathematics at Lipson Vale Primary School

At Lipson Vale Primary School we follow the National Curriculum to structure and shape our teaching of mathematics. Curriculum content for each year group is taught as per the National Curriculum.

We believe that, and ensure through our teaching, mathematics is a rich and creative subject in which all pupils can succeed and experience success. As such, we hold the aims of the National Curriculum as our overarching guiding principles for shaping the provision of mathematics.

Aims

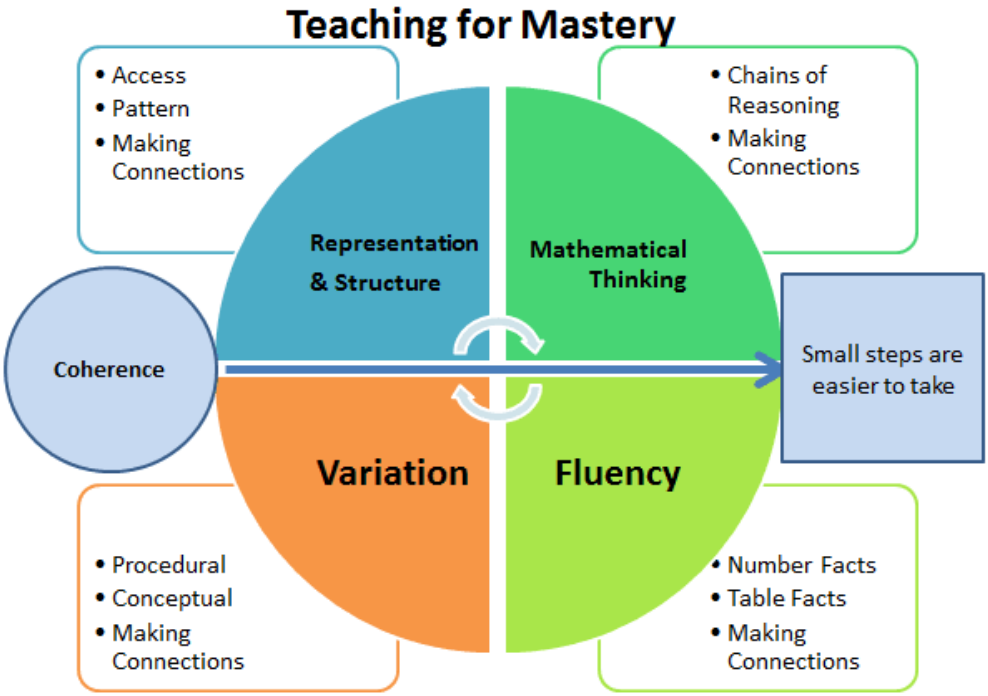
The national curriculum for mathematics aims to ensure that all pupils:

- 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 nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Furthermore, at Lipson we aim

- To enable pupils to be proficient, competent and confident with numbers and the number system, calculations, measures, shape and space and statistics.
- To enable the children to master the curriculum, to broaden and deepen their knowledge and understanding.
- To foster positive attitudes towards mathematics by developing pupils' confidence, independence, persistence and co-operative skills.

Research and development by the NCETM (National Centre for Excellence in the Teaching of Mathematics) has been influential in our development of pedagogy surrounding the teaching of mathematics and has shaped our understanding of 'Teaching for Mastery'. The NCETM produced '5 Big Ideas' for Teaching for Mastery; they are:



NCETM: www.ncetm.org

To enable the whole school community to embed these '5 Big Ideas' in our classroom practice, at the benefit of deep and sustained learning by all pupils, we consult the following high-quality resources as a starting point when shaping a lesson:

- White Rose Maths Resources
- Power Maths
- NCETM Mastery Professional Development materials

In using these resources, teachers are able to spend greater amounts of time considering the experiences and journey for pupils through a single lesson or sequence, rather than time spent creating resources. This shift enables teachers to consider, in greater detail, how key concepts will be introduced, challenged and generalised.

Our Mathematics Ethos:

At Lipson Vale Primary school, we want our teaching of mathematics to recognise and celebrate the importance of mathematics in our wider lives. We want for children to love and celebrate mathematical understanding as a way of accessing real-life contextualised problems and for all children to be curious and inquisitive about learning mathematics. As such, we aim to achieve this by cultivating an ethos in the teaching of mathematics that celebrates:

- The **real-life contexts** within mathematics that provides meaning and relevance allowing the children to make sense of the world around them.

- A firm belief that **attainment is not fixed** and every child has the right to achieve in mathematics
- The **risk taking** of both pupils and teachers throughout our teaching of sequences
- The understanding that children should experience mathematics that encompasses John Mason's '**working on, not working through**'.
- We differentiate access to learning by providing '**low threshold, high ceiling'** tasks.
- All children's ability to be **divergent thinkers** in mathematics.

What is 'Teaching for Mastery'?

Teaching maths for mastery involves employing approaches that help pupils to develop a deep and secure knowledge and understanding of mathematics at each stage of their learning, so that by the end of every school year or Key Stage, pupils will have acquired mastery of the mathematical facts and concepts they've been exposed to, equipping them to move on confidently and securely to more advanced material.

Two fundamental points need to be considered:
(1) Acquiring mastery of mathematics is something for *all* pupils.
(2) Teaching for mastery approaches *can* enable all pupils (with only a tiny proportion of exceptions) to succeed in maths.

If understanding in any mathematical area is deep (not superficial) then it will mean the learner has recognised and grasped connections between the concept in question and concepts in other areas of maths. It will mean they can explain why something in this mathematical area works, and why, perhaps if just one parameter changes, it doesn't work.

Vitally, because maths continually builds on itself, it will mean they will have developed secure, lasting mathematical understanding on which they can build more advanced mathematical ideas at the next stage in their learning.

To provide extra challenge for all children, Star Challenges are available during the lesson. These challenges should help children explore and develop their deeper understanding of the concepts being taught.

Underlying principles for Teaching Mathematics:

As a school community we have, through exploration and research, concluded that the following principles will underpin our teaching of mathematics:

1. Our planning will reflect small steps of learning which link together to create a cohesive learning journey. These are the key learning opportunities that the children need to master.
2. We understand the 'goal' in learning for each learning sequence and plan to ensure this is reached.

3. We focus on mathematical structures to support children <u>understanding</u> the mathematical concept.
4. We deepen mathematical thinking by exploring a concept through variation and providing examples and non-examples.
5. Intelligent practice is at the heart of lesson design - we focus on thinking not doing.
6. Pupils are given clear models of mathematical structures and concepts which they then apply.
7. Focus and time is given to representing mathematical concepts using structured and unstructured apparatus.
8. Pupils communicate their mathematical thinking with clarity and precision. Scaffolds for precise communication are provided through STEM sentences.
9. Teaching of key concepts is explicit and precise.
10. We use misconceptions as a vehicle for teaching concepts.

What this might look like in the classroom?

The principles above are evident within our teaching throughout a lesson and sequence. Each lesson (or sequence of lessons) should include – explore, practice, apply and challenge.

When you walk into any mathematics lesson you will see:

1. Deep mathematical discussion
2. Pupils 'working on' mathematical problems
3. Facilitated discussion and modelling
4. Carefully chosen problems which encourage depth of understanding.
5. Star challenges which ALL children can access throughout the lesson when/if they have completed the learning opportunities set.

Other elements of 'mastery' teaching might include:

These would be evident across a sequence of learning, but not necessary in every lesson.

Multiple ***REPRESENTATIONS*** of mathematical concepts	***VARIATION*** (both conceptual and procedural)	***STEM SENTENCES*** *(to support acquisition of technical vocabulary)*
INTELLIGENT PRACTICE (precise design of tasks, series of questions)	***COHERENCE*** *(order, sequence, small steps)*	***FLUENCY*** (flexible, accurate, efficient)
DIFFERENTIATION (through breadth of understanding and anticipating misconceptions))	***GENERALISED STATEMENTS*** (Find a rule, describe a pattern, Odd one out, What it is, What it isn't, What could the answer be?)	***GOING DEEPER/THE TWIST*** (An opportunity for the children to apply their understanding in a different context or think about it in another way)

'Don't just answer the question...question the answer!

Assessment and Monitoring

- Termly data and use of NfER tests will be analysed to recognise progress in mathematics.

Summative assessment timetable:

- Maths NFER tests to be used to assess children at the end of Autumn Term 2.
- White Rose Autumn tests to be used to test children at the end of Spring Term 1.
- White Rose Spring tests to be used to assess children at the end of Spring Term 2.
- Maths NFER tests to be used to assess children at the end of Summer Term 2.

These summative assessments should be marked by the Teacher and analysed to identify focus areas (units/concepts that are a weakness) and focus children (those that are falling behind from their F/KS1 progress data) and next steps. This should be recorded at the end of each half term on **the Maths Assessment and Monitoring document** provided to be shared with Year group team, Maths subject leaders and next class Teacher.

- Pupils are expected to record their understanding and mathematical thinking (in words or pictures) which enabled them to reach an answer.

- Corrections, when appropriate, should be made by children in their books – making the learning process clear (purple pen should be used).

- Children should traffic light their learning and Teacher should scan all learning completed following the lesson and triangle the L.O (and the Small Steps Grid) so that attainment can be established and inform the judgements place on Sims. This should also influence further planning and delivery of the next steps in learning.

- Daily AfL through questioning, live marking (by Teacher/Teaching Assistants/self/peer) and feedback contribute to the assessment picture of individuals, and it will be evident in books when verbal feedback (VF/D) or intervention has taken place.

- Both formative and summative assessment should be used to plan interventions to close the gap in attainment (this will likely involve Teachers/Teaching Assistants/HLTA's/SEN base).

- The Mathematics lead and Senior Leadership Team will routinely monitor the impact of CPD on the quality of teaching and learning.

- The Mathematics lead and Senior Leadership Team will routinely monitor the overall quality of teaching and the impact this has on progress for all pupils.