Maths Parents' Meeting
January 2023

Outline for the session

- Our Maths Programme *Underpinning Principles*
  Teaching for Mastery
- Changes to how we teach
- Lessons

  - Composition
  - Subitising
  - Maths Skills

The Maths Programme

Underpinning principles

- Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.

- Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.

- Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching.

- Curriculum design ensures a coherent and detailed sequence of essential content to support sustained progression over time.

What is teaching for mastery?

Mastering maths means pupils of all ages acquiring 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 maths that has been taught to enable pupils to move on to more advanced material.

Maths Mastery/ncetm.org.uk

How do we teach?

Pupils are taught through whole-class interactive teaching, enabling all to master the concepts necessary for the next part of the curriculum sequence.

In a typical lesson, the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems.

Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively.

If a pupil fails to grasp a concept or procedure, this is identified quickly, and gaps in understanding are addressed systematically to prevent them falling behind.

Significant time is spent developing deep understanding of the key ideas that are needed to underpin future learning.

Key number facts are learnt to automaticity, and other key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable pupils to focus on new learning.

Lessons – what do they look like?

Lesson design links to prior learning to ensure all can access the new learning and identifies carefully sequenced steps in progression to build secure understanding.

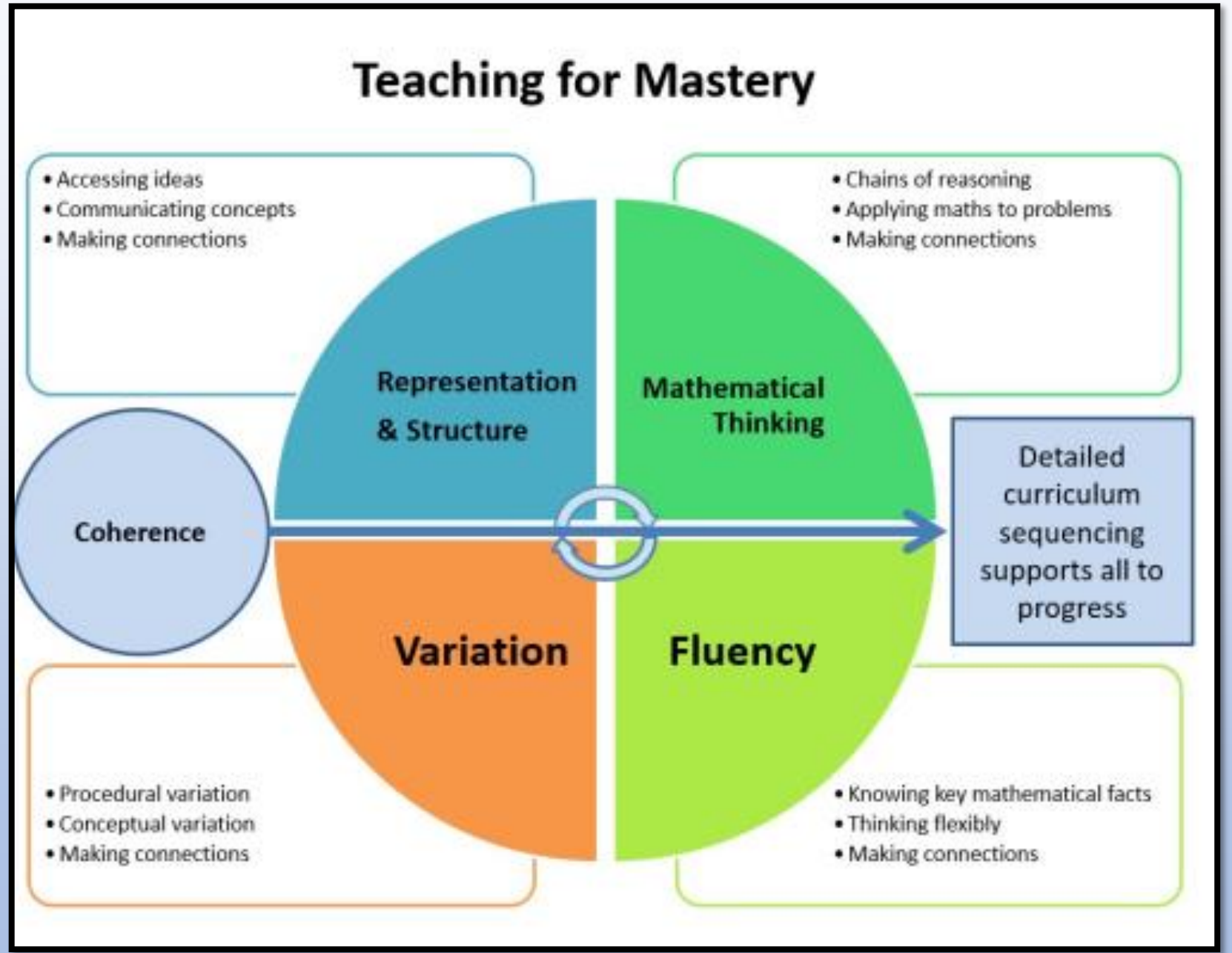
Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling pupils to develop a deep knowledge of mathematics.

Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.

It is recognised that practice is a vital part of learning, but the practice must be designed to both reinforce pupils' procedural fluency and develop their conceptual understanding.

The Essence of Teaching for Mastery was first published by the NCETM in 2022.

Five Principles



Five Principles

1) Coherence
Teaching is designed to enable a coherent learning progression through the curriculum, providing access for all pupils to develop a deep and connected understanding of mathematics that they can apply in a range of contexts.

2) Representation and Structure
Teachers carefully select representations of mathematics to expose mathematical structure. The intention is to support pupils in 'seeing' the mathematics, using mental images that students can use to think about mathematics, supporting them to achieve a deep understanding of mathematical structures and connections.

3) Mathematical Thinking
Mathematical thinking is central to how pupils learn mathematics and includes looking for patterns and relationships, making connections, conjecturing, reasoning, and generalising.

4) Fluency
Efficient, accurate recall of key number facts and procedures is essential for fluency, freeing pupils' minds to think deeply about concepts and problems. In turn this gives pupils flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to choose appropriate methods and strategies to solve problems.

Five Principles

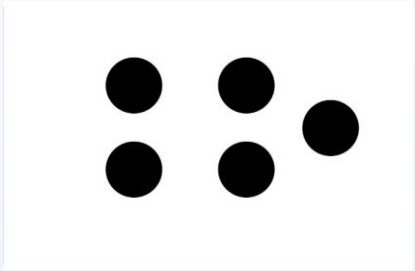
5) Variation
The purpose of variation is to draw closer attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant.

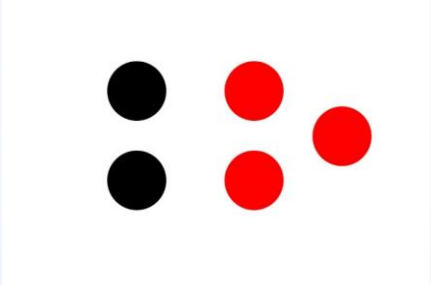
Conceptual variation involves varying how a concept is represented to draw attention to critical features. Often more than one representation is required to look at the concept from different perspectives and gain comprehensive knowledge.

Procedural variation considers how the student will 'proceed' through a learning sequence. Purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding students' thinking to enable them to reason logically and make connections.

The Five Big Ideas were first published by the NCETM in 2017.

What is subitising?





Subitising is a term that was introduced by the Swiss psychologist Piaget. It is:
the ability to look at a small number of objects and instantly recognise how many objects there are without needing to count.

In early years, children look at tally marks, how many fingers are being held up or the dots on dice to help develop this skill.

There are actually **two types of subitising: perceptual and conceptual**.
Our brains can only easily subitise numbers up to five — this is called perceptual subitising.

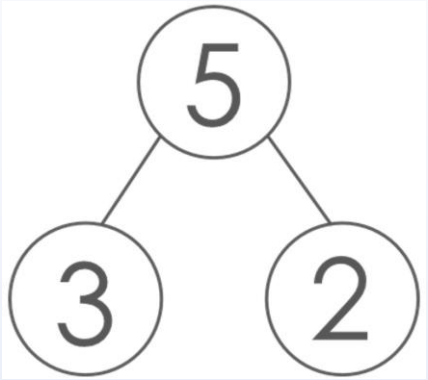
Anything above five involves conceptual subitising. This is because the numbers start to relate to a larger quantity of things and identifying 'how many' without counting becomes more difficult. Eg to subitise six, we need to subitise three and three; or four and two; or five and one. Only then could we combine the number pairs together to arrive at an answer of six.

Why is subitising important?

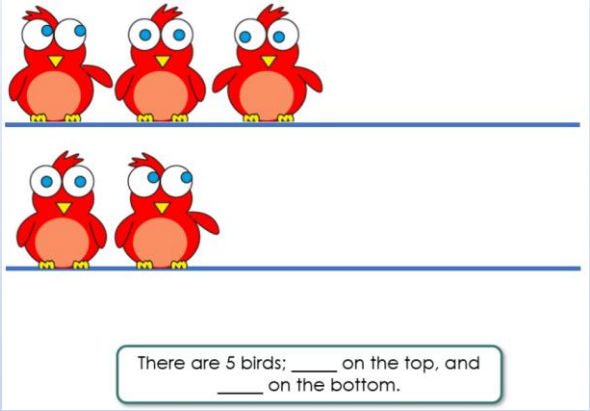
Subitising is important for children's mathematical development for many reasons:

- It helps children to understand what numbers mean or how many 'things' a number refers to.
- It helps learners with pattern recognition.
- It helps children to not over-rely on counting.
- Subitising is an alternative maths strategy that is more efficient when dealing with smaller numbers. It helps children to see how numbers are made up.
- For example, you can make the number eight using many pairs: 1 + 7, 2 + 6, 3 + 5 and 4 + 4. By separating and combining numbers through subitising, children lay the foundations for addition and subtraction.
- Children also learn an important mathematical law through subitising: it doesn't matter in what order you add numbers together, as you always get the same answer!
- For example, 2 + 3 = 5 and 3 + 2 = 5.

Composition of number



When a child understands the composition of number, they understand that numbers are made up of other numbers. They ‘see the numbers inside’ other numbers: first, that all numbers are made up of ones, and then that they can be made up of pairs of bigger numbers.
So for example, 5 is made of ‘five ones’, or of ‘1 and 4’, or of ‘2 and 3’.
The CBeebies' *Numberblocks* characters demonstrate this with their ability to split into other characters as shown in this clip: https://youtu.be/zLZNSNj5nVg



Composition is also crucial in starting to understand addition and subtraction and their inverse relationship. For those that understand composition of number, remembering that 2+3=5 and 5-2=3, and how these two facts relate, is less a matter of repetition and memorisation and more the application of structural understanding. When we add, we compose: when we subtract, we decompose.

Math Skills

Children's chances of success are maximised if they develop deep and lasting understanding of mathematical procedures and concepts.

Children apply the skills of composition to addition and subtraction – without learning this as a skill on its own. They just know it!

Children learn the skill of subitising (knowing how many there are) which supports later learning of knowing numbers (what each digit represents and means). Subitising also supports addition as children learn the skill of conceptual subitising (recognition of larger numbers by breaking numbers down into parts eg 6 is 3 + 3)

Children are less reliant on counting – mistakes are less common

This programme develops a child's confidence in Maths, a growth mindset of "I can do it" which aids them as they progress through the years.

The aim of the NCETM Programme is to start slow to go fast. It is important to realise that this does not mean that all children are not appropriately challenged and stretched.

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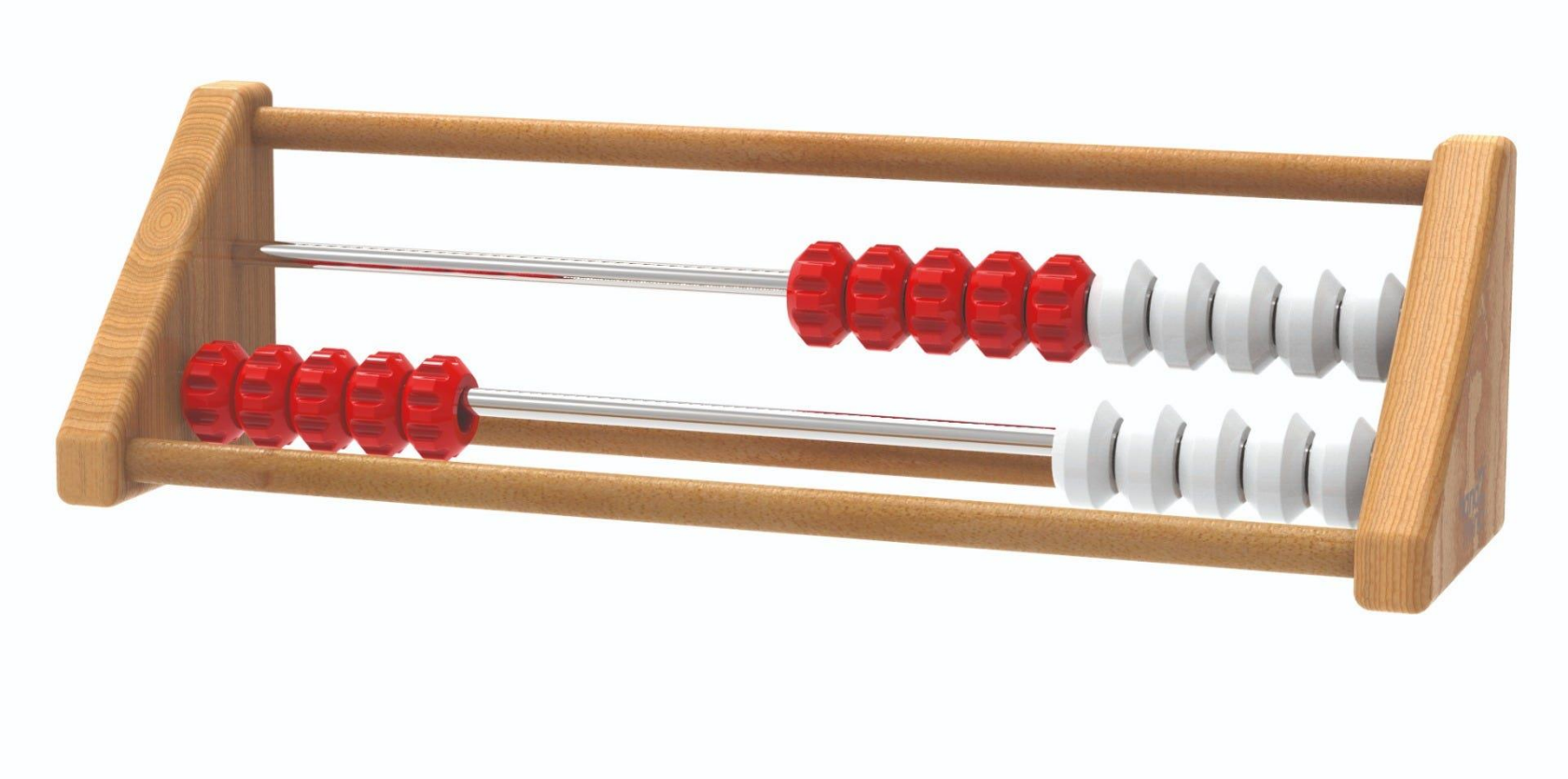

How can I help my child?

What does my child need to know at the end of Reception now?

What does my child learn the their Reception year?

- Count objects, actions and sounds
- Subitise
- Link the number symbol (numeral) with its cardinal number value
- Count beyond ten
- · Compare numbers
- Understand the ‘one more than/one less than’ relationship between consecutive numbers
- Explore composition of number to 10
- Automatically recall number bonds for numbers 0–5 and some to 10
- Select, rotate and manipulate shapes to develop spatial reasoning skills
- Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can
- Continue, copy and create repeating patterns
- Compare length, weight and capacity

Subitising and composition games and activities for EYFS

You do not need to spend lots of money or use a big bank of resources to help your child with subitising. Here are a few activity ideas:

Use your hands
You can use your hands to visualise numbers. For example, five can be represented by five fingers on one hand, or three fingers on one hand and two fingers on the other.

Fantastic flashcards
Make some flashcards that show dot patterns, tally marks and fingers being held up (if you are feeling creative!). Can your child tell you how many there are without counting?
To make this harder, show them a flashcard for only a few seconds and then hide it! This encourages them to subitise rather than count. Once secure in this, they can match dot patterns with digit cards, again without counting.

Colourful counters
Throw a small number of counters in two different colours on a table and ask your child to say what they see.
For example, “I see three red counters and two yellow counters. There are five counters altogether”.
You don’t have to use counters either — there are plenty of alternatives that would suffice!

Subitising and composition games and activities for EYFS

Mathematical board games
You can put all of the above tips into action while playing board games. Games using two or more dice are a great way of subitising.

Use bricks / Lego etc to show different ways to make a number
Create shapes using the bricks to represent composition: 3 red bricks and 2 yellow bricks, 4 blue bricks and 1 green brick etc. – switcher!!!

These can then be recorded in the whole and part number circles (shown on slide 12) OR using the number sentences there are 5 bricks, 3 on top and 2 on the bottom. This helps children consolidate their knowledge and reinforces the link between the abstract digit and physical representation and meaning of the number.

Thank you for attending!!