

Mastery

What is all about?

What is mastery?

- * A high **level** of performance for all
- * Keeping the class working together whilst addressing the needs for all pupils to master the curriculum and for some to gain greater depth and proficiency
- * A **mind-set** - All children can achieve with good teaching, appropriate resources, effort and a 'can-do' attitude.
- * The manner in which the **curriculum** is designed, focusing on fewer topics in depth, repetition and application. All pupils have access to the ideas and concepts

Rationale for the new curriculum

The new curriculum was introduced to raise standards. It was:

- * written on the back of a huge amount of research evaluating the most successful curricula around the world; especially in the highest performing jurisdictions, e.g. Singapore, Japan, South Korea and China.
- * The Organisation for Economic Cooperation & Development (OECD) suggests that by the age of 15 students from these countries are on average up to 3 years ahead in maths compared to 15 year olds in England.

Sequencing

- * In looking at the curricula in other places, great attention was paid to the **sequencing of key concepts**.
- * A critical concept of the new curriculum is that it encourages the learning of **fewer things in greater depth**. When compared to other curricular, it was obvious that in England greater attention was given to the acceleration of pupils through content, often at the expense of developing deep understanding.

Pace

The National Curriculum states:

‘There is an expectation that the majority of pupils will move through the programme of study at broadly the same pace and that pupils who grasp concept rapidly should be challenged through rich and sophisticated problems before any acceleration to new content.’

Mastery and depth – towards a definition

- NOT working on content from the next year group.
- In mathematics – NOT practising the same concept with bigger numbers.
- In reading – NOT necessarily reading a more challenging text.
- NOT just the domain of ‘more able’ pupils

The mindset behind a mastery based curriculum

* Benjamin Bloom - Mastery learning is based on 3 assumptions:

- Almost every pupil can learn a topic to mastery
- Some pupils need more time than others
- Some pupils need more help than others

Therefore, most pupils can learn if given sufficient time and quality teaching to do so

In conclusion

- All/most learners, with effort, will meet expectations.
- Development of **deep** knowledge.
- Great teaching, based on formative assessment, particularly great questioning, is key.
- Precise assessment with Pre- teaching/learning
- Keeping the class working together: Quick intervention → **keep up, not catch up**
- Longer time on key topics

What is Mastery of Mathematics?

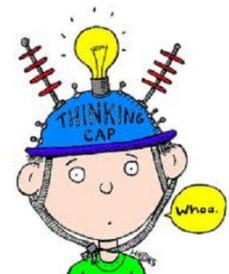
- **Deep** and sustainable learning – **for all**

Depth is the key to avoiding the need to repeat teaching.

It doesn't feel like we're starting again each term.

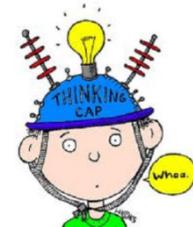
- The ability to build on something that has already been sufficiently mastered

... for this stage of learning - Mastery is a continuum



What is Mastery of Mathematics?

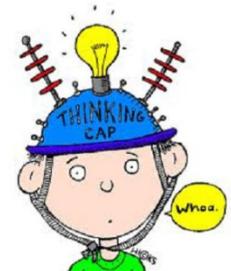
- **The ability to reason about a concept and make connections**
 - Cuts down on the amount I need to learn
eg relating concepts of division, fractions and ratio
 - Deepens conceptual understanding.
- **Conceptual and procedural fluency**
 - Move maths from one context to another. Recognise concepts in unfamiliar situations.
 - Know number facts and tables, have efficient procedures



What is Mastery of Mathematics?

A mastery approach: a set of principles and beliefs. This includes a belief that all pupils are capable of understanding and doing mathematics, given sufficient time. Pupils are neither ‘born with the maths gene’ nor ‘just not good at maths’. With good teaching, appropriate resources, effort and a ‘can do’ attitude all children can achieve in and enjoy mathematics.

NCETM



How will we achieve this?

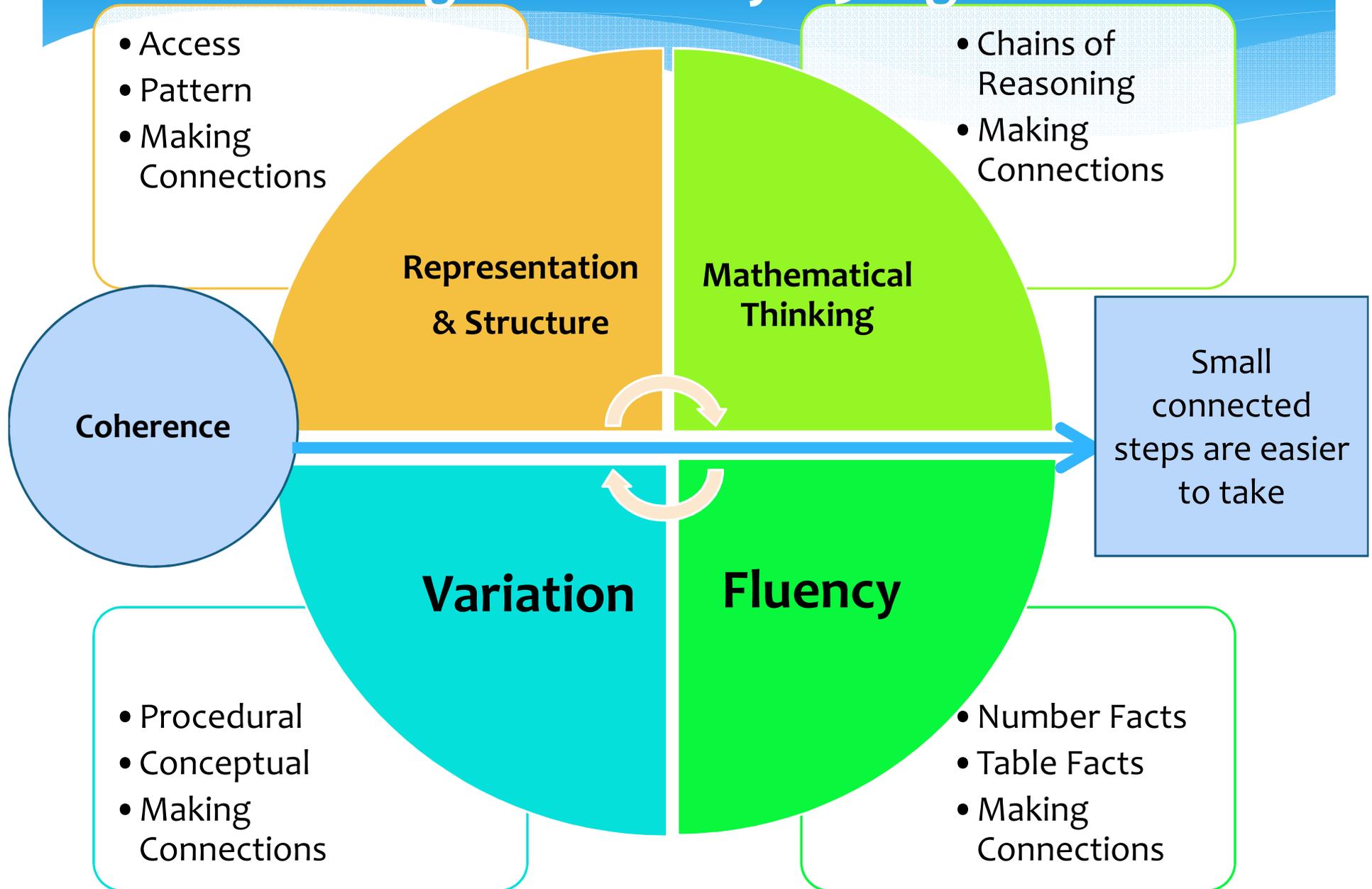
- Complete change in mindset for teachers, parents and the children themselves
- The belief and expectation that **all** pupils can achieve.

Growth mindset – I can't do it yet!

- Children discuss and share learning together so all can access and master maths.



Teaching for Mastery – 5 Big Ideas



How will we achieve this?

We're continuing to...

- develop reasoning **with all**
What do you notice?
What's the same?
What's different?



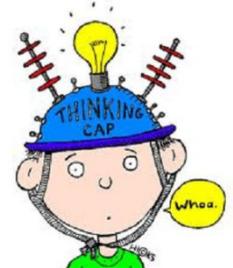
How will we achieve this?

We're continuing to...

- develop reasoning **with all**

What do you know?

What do you want to know?



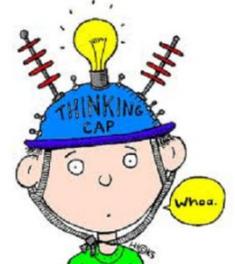
How will we achieve this?

We're continuing to...

- develop reasoning **with all**

- what do you notice?
- true or false?
- odd one out?
- do, then explain

- spot the mistake
- give an example of ...
- continue the pattern
- convince me/prove it



How will we achieve this?

We're continuing to...

- use lots of models, images and practical apparatus.

Resources to help build concepts

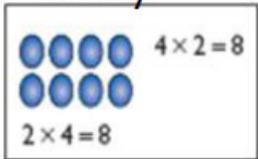
Numicon



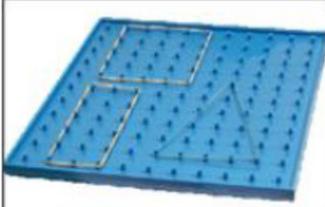
number line



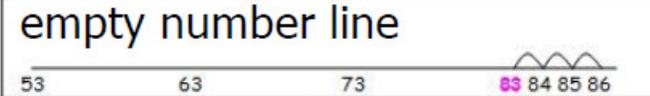
array



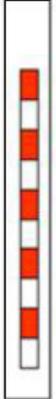
geoboard



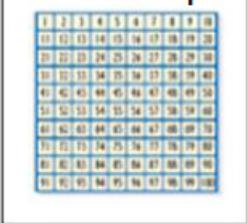
empty number line



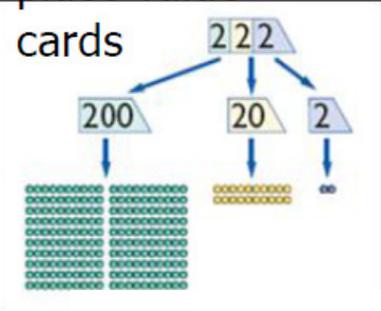
counting stick or metre rule



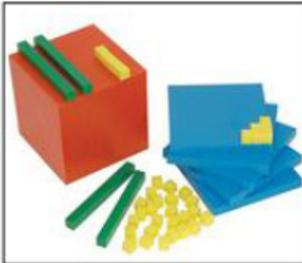
hundred square



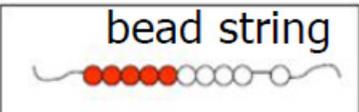
place value cards



base ten blocks



bead string





Flexibility with different representations is an important element of fluency.

inspector training for mathematics 2013

How will we achieve this?

We're experimenting with...

- Development of deep mathematical understanding through lesson planning/ design
 - small steps
 - What is the key learning for the lesson?
 - difficult point
 - critical point
- Longer time on key topics, providing time to go deeper and embed learning – Long term planning

How will we achieve this?

We're experimenting with...

- **Memorisation – Rehearse and repeat**

plays a crucial role in learning

If we memorise something we've understood →
learning far more embedded and far more secure
(Daniel Willingham – cognitive scientist)

- **Use of precise language and speaking in full sentences** → gives children the language in order to express the maths and hang learning on.

How will we achieve this?

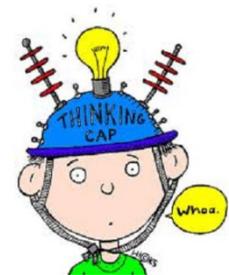
We're experimenting with...

**A different approach to differentiation
and intervention**

- Emphasis on developing deep understanding
not pushing children on to new content
- Support for those struggling

'keep up' not 'catch up'

Use of resources to support/ scaffold learning



How will we achieve this?

We're experimenting with...

- **A different approach to differentiation and intervention**

Ofsted

- Intervention – within and outside of lessons – is likely to be focused on ensuring pupils are helped to keep up by revisiting concepts or essential prior learning, plugging gaps, or providing additional consolidation.

- Pre-teaching?
- Intervention – that day?
- Intervention - next day – assembly?
- Change to lesson structure? Start with support/ additional practice if needed?



How will we achieve this?

We're experimenting with...

- **A different approach to differentiation and intervention**

Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content.

- Different view of ability

Rapid graspers for 'that lesson'

Demonstrate depth of understanding –
MASTERY WITH GREATER DEPTH



How will we achieve this?

Do you agree? (true/false, etc)

Explicit use of misconceptions and mistakes

Probing questions (show me, convince me, what's the same, what's different?, etc)

The missing digit/number (empty box)

Here's the answer, create the question

