BROMSGROVE
INTERNATIONAL SCHOOL THAILAND

Maths:
Calculation Methods

Our approach
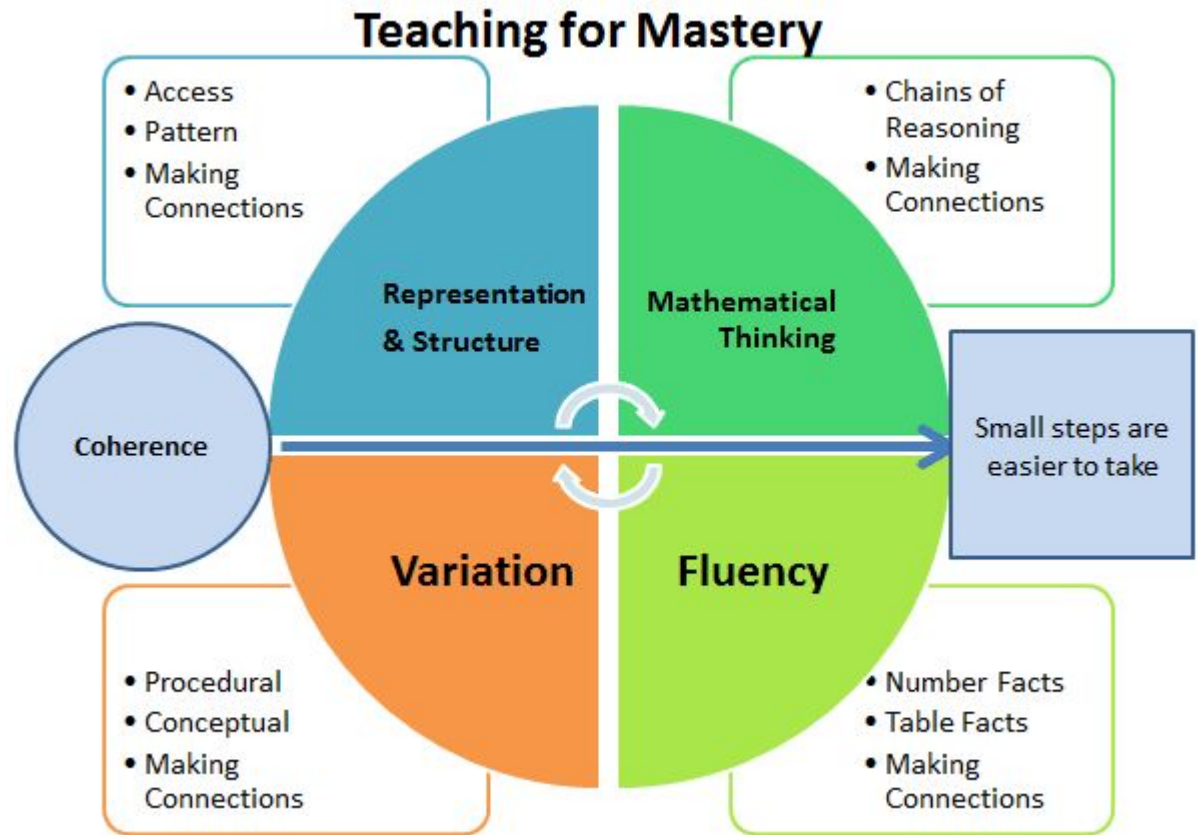
Mastering maths means pupils of all ages acquiring a deep, long-term, secure and adaptable understanding of the subject. Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material.

Our approach

Mastery is characterised by a belief that, **by working hard, all children are capable of succeeding at mathematics.** On this basis, children are taught all together as a class and are not split into 'prior attainment' groupings.

Carefully structured teaching is planned in small steps. This provides both the necessary scaffold for all to achieve, and the necessary detail and rigour of all aspects of the maths to facilitate deep thinking. The small steps are connected and concepts are built. This leads to generalisation of the maths, and the ability to apply it to multiple contexts and solve problems.

It is expected that those children who will achieve well on a particular topic may not necessarily be the same children who achieved well on other topics. **Interventions are provided for any pupils who do not fully grasp the concept by the end of a learning block**, in order that they 'keep up' with the class. Our experience shows that it is not always the same pupils who require this form of intervention but very much depends on the topic.

Maths Meetings 4 times a week are also used to aid the retainment of learning.

Coherence

Lessons are broken down into small connected steps that gradually unfold the concept.

Autumn	Number: Place Value	Number: Addition and Subtraction	Measurement: Length and Perimeter	Number: Multiplication and Division	Consolidation
Spring	Number: Multiplication and Division	Measurement: Area	Number: Fractions	Number: Decimals	Consolidation
Summer	Number: Decimals / Measurement: Money	Measurement: Time	Statistics	Geometry: Properties of Shape / Geometry: Position and Direction	Consolidation

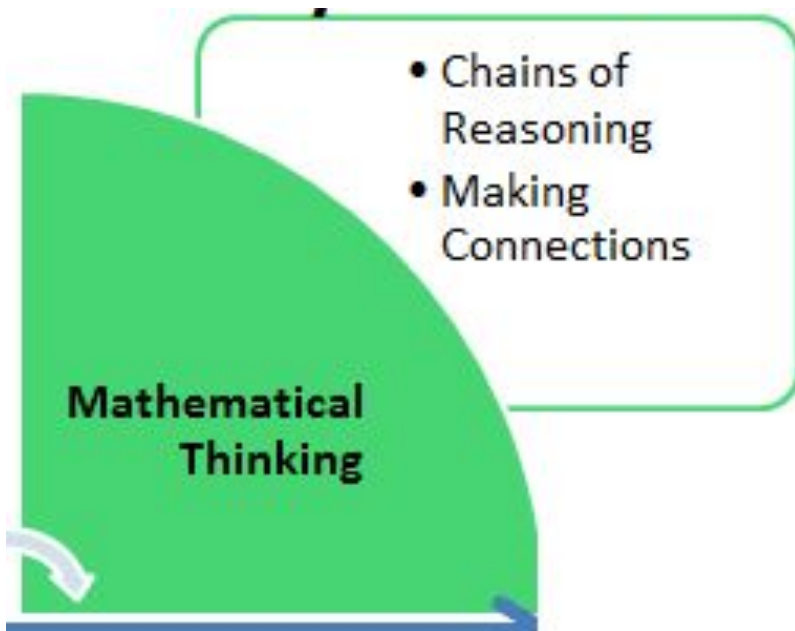# Representation and Structure

- Access
- Pattern
- Making Connections

Representation & Structure
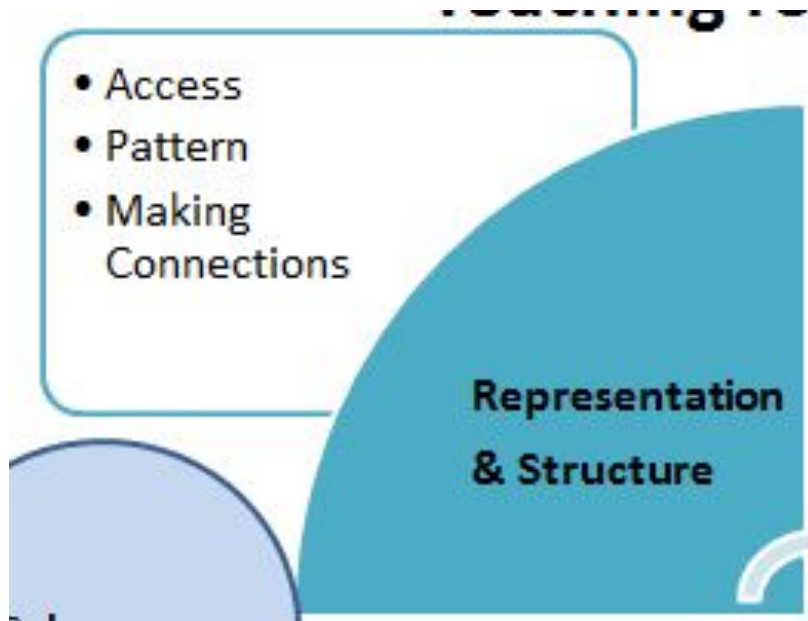
Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

CONCRETE   PICTORIAL   ABSTRACT

$$2 + 1 = 3$$

Mathematical Thinking

- Chains of Reasoning
- Making Connections

Mathematical Thinking

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 with and discussed with others.

Always? Sometimes? Never?

When you add two even numbers it makes an odd number.

Fluency

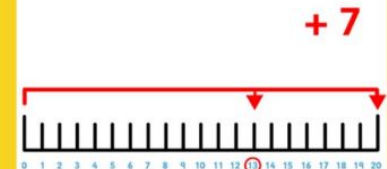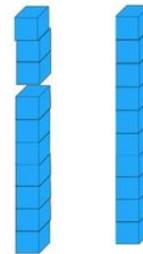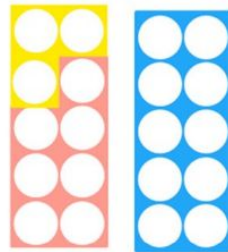**Fluency**

- Number Facts
- Table Facts
- Making Connections

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

13 + 7 = 20
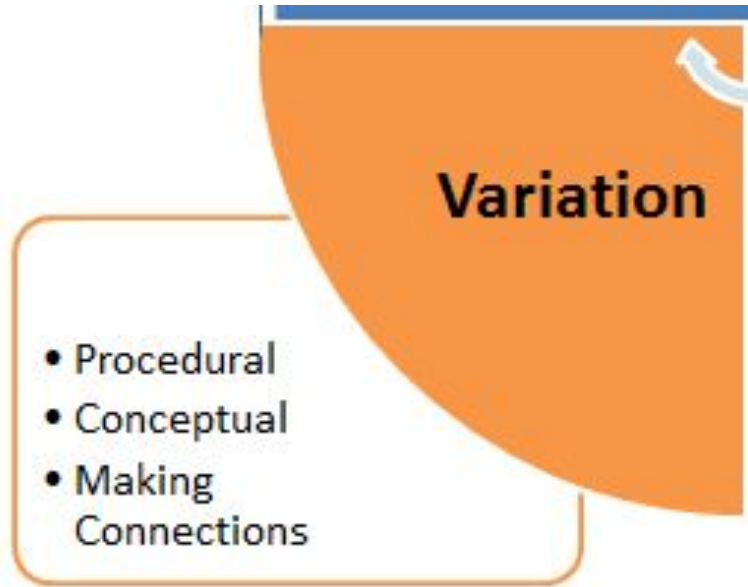7 + 13 = 20
20 - 13 = 7
20 - 7 = 13

+ 7

Variation

Variation

- Procedural
- Conceptual
- Making Connections

Autumn	Number: Place Value		Number: Addition and Subtraction	Measurement: Length and Perimeter	Number: Multiplication and Division	Consolidation
Spring	Number: Multiplication and Division	Measurement: Area	Number: Fractions		Number: Decimals	Consolidation
Summer	Number: Decimals	Measurement: Money	Measurement: Time	Statistics	Geometry: Properties of Shape / Geometry: Position and Direction	Consolidation

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 lessons, 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.

Progression of Written Calculation Methods

	Addition	Subtraction	Multiplication	Division
Reception	Using practical resources	Using practical resources	Using practical resources	Using practical resources
Year 1	Using a number line or hundred square	Using a number line or hundred square	Using practical resources, recording in a non-written method Number lines	Using practical resources, recording in a non-written method

Bar Modelling is used as a pictorial representation throughout all year groups.

Progression of Written Calculation Methods

	Addition	Subtraction	Multiplication	Division
Year 2	Using an empty number line Partitioning	Using an empty number line (counting on and back)	Number lines Arrays Partitioning	Number lines (single jumps) Number lines (chunking)

Bar Modelling is used as a pictorial representation throughout all year groups.

Progression of Written Calculation Methods

	Addition	Subtraction	Multiplication	Division
Year 3	Using an empty number line Partitioning Expanded Column Method	Using an empty number line (counting on and back)	Number lines Arrays Partitioning Grid method	Number lines (chunking)

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Progression of Written Calculation Methods

	Addition	Subtraction	Multiplication	Division
Year 4	Expanded Column Method Short Column Method	Using an empty number line (counting on and back) Expanded column method	Partitioning Grid method Expanded Column Method	Number lines (chunking) Expanded method (long division)

Bar Modelling is used as a pictorial representation throughout all year groups.

Progression of Written Calculation Methods

	Addition	Subtraction	Multiplication	Division
Year 5	Both column Method including decimals	Expanded column method Short column method	Expanded Column Method Short multiplication	Expanded method

Bar Modelling is used as a pictorial representation throughout all year groups.

Progression of Written Calculation Methods

	Addition	Subtraction	Multiplication	Division
Year 6	Both column Method including decimals	Expanded column method Short column method	Short multiplication	Expanded method Short division

Bar Modelling is used as a pictorial representation throughout all year groups.

Language

Here are three digit cards.

| 8 | 6 | 7 |

Place the digit cards in the number sentence.

How many different totals can you find?

☐☐ + ☐ =

What is the smallest total?

What is the largest total?

What is the difference between them?

THANK YOU