

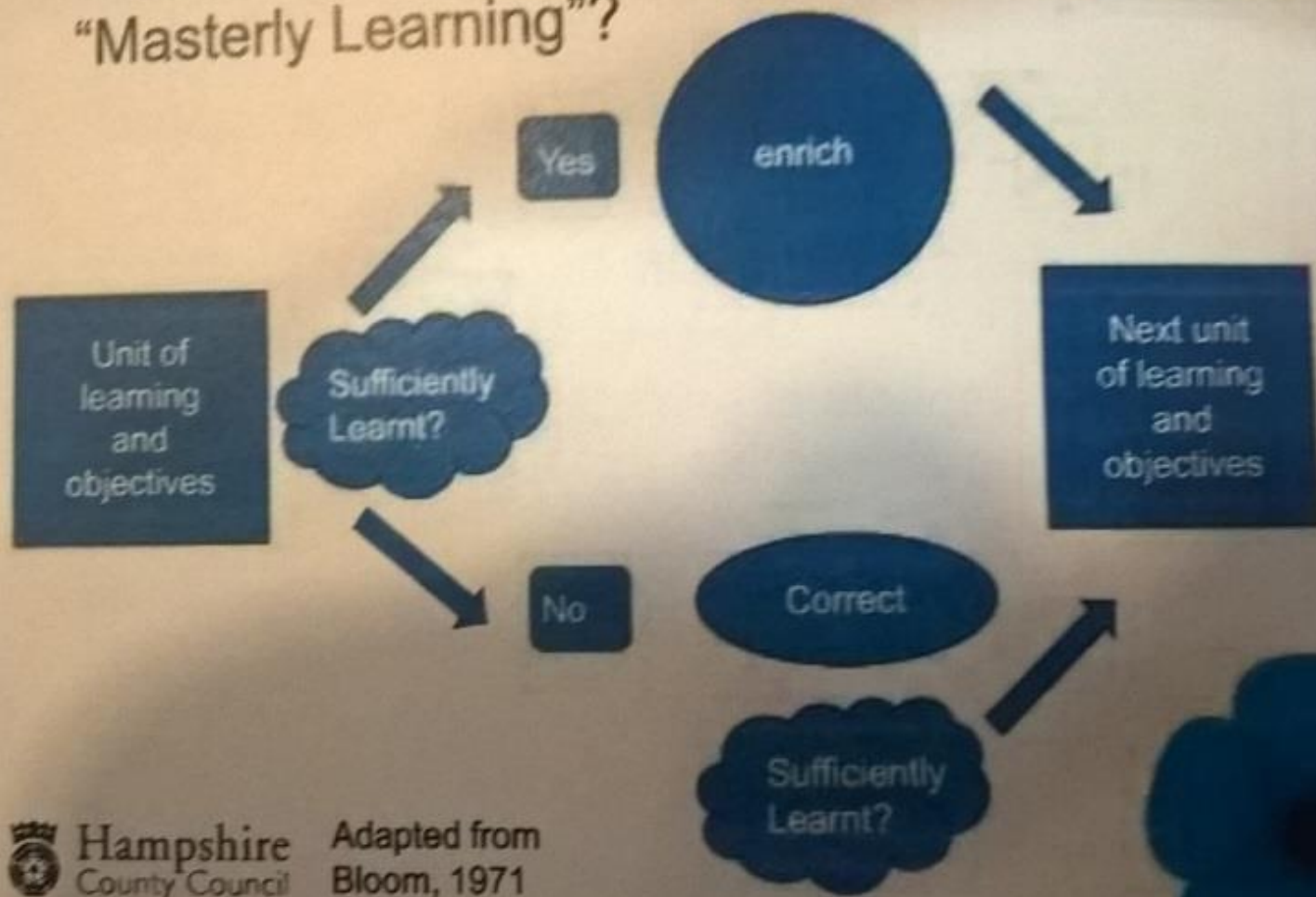
# Maths Information evening

Thursday 17 March 2016

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

# A working model for "Masterly Learning"?



# Mastering mathematics

Dr Helen Drury

In mathematics, you know you've **mastered** something when you can apply it to a totally new problem in an unfamiliar situation.

Mastered through: **exploration, clarification, practice and application over time.**

A cumulative curriculum, with **sufficient time** for every child to access age-appropriate concepts and skills.

**Supporting and challenging pupils through depth:** mathematical thinking, multiple representations, communication.

**Taking things slower for everyone** – spending longer with new concepts. Not accelerating relatively high attainers by rushing to cover content.

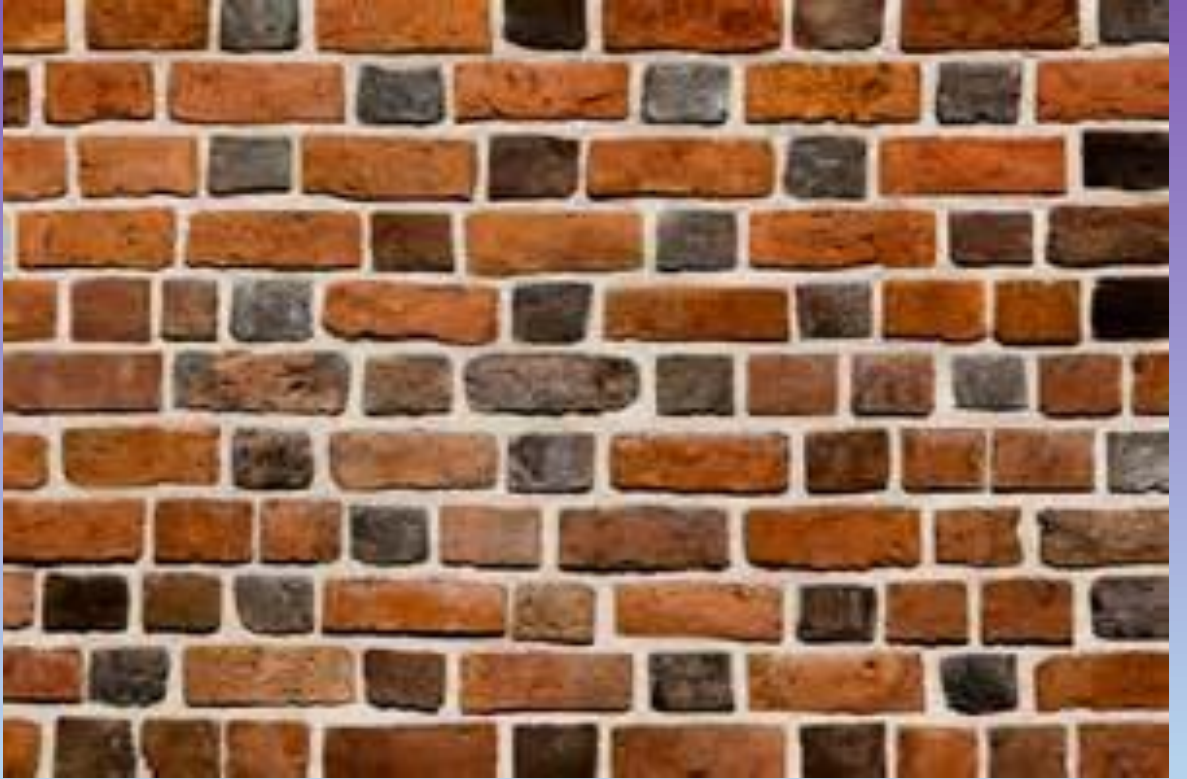
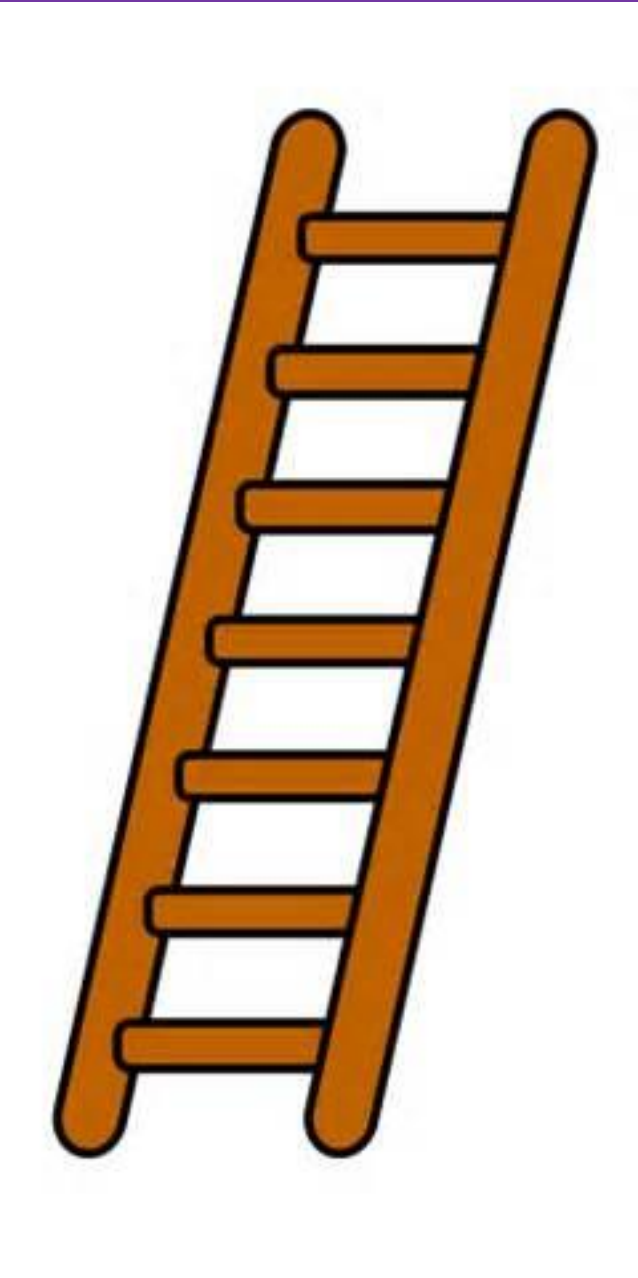
**Multiple representations:** grasp underpinning concepts through **concrete experience**, gain a more complete and connected perspective, **give abstract mathematical concepts meaning and relevance.**

**Language and communication:** every single lesson has time set aside for **conversation about mathematics**, articulating ideas brings about reflection and refinement, listening to others modifies your own thoughts, explicit modelling of mathematical talk, insistence on complete sentences.

**Thinking mathematically:** generalise, seek patterns and connections, make choices, ask questions, make and learn from mistakes, organised and systematic.

## National Centre of Excellence in Teaching of Mathematics (NCETM)

*“Progress in mathematics learning each year should be assessed according to the extent to which pupils are **gaining a deep understanding** of the content taught for that year, resulting in **sustainable knowledge and skills**. Key measures of this are the abilities to **reason mathematically** and to **solve increasingly complex problems**, doing so with **fluency**”*



## Key Stage 1 (Y1 & Y2)

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils **develop confidence and mental fluency with whole numbers, counting and place value**. This should involve working with numerals, words and the four operations, including with practical resources. By the **end of year 2**, pupils should know the **number bonds to 20** and be **precise in using and understanding place value**. An emphasis on practice at this early stage will **aid fluency**.

- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Measurement
- Properties of Shape
- Position and Direction
- Statistics (Y2)



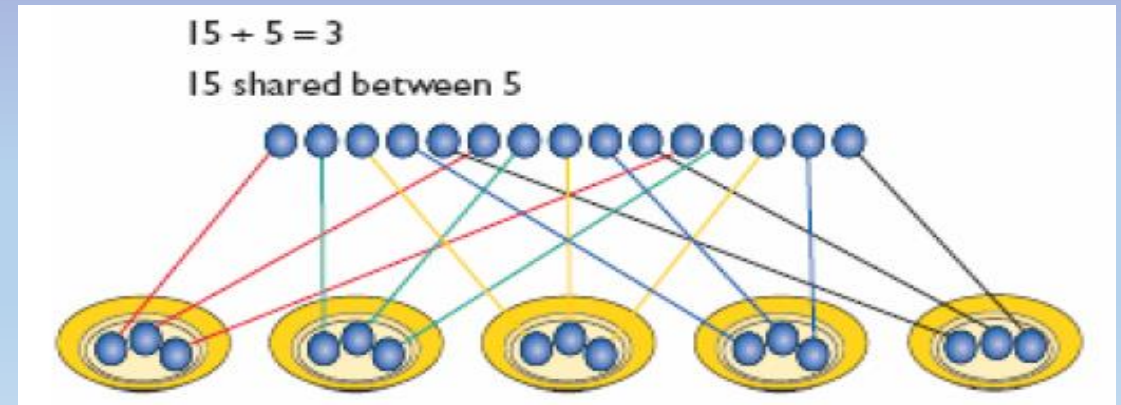
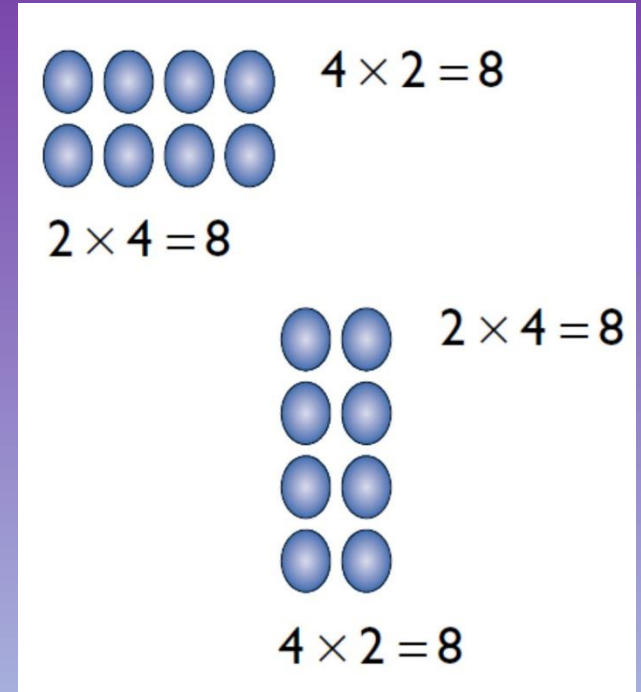
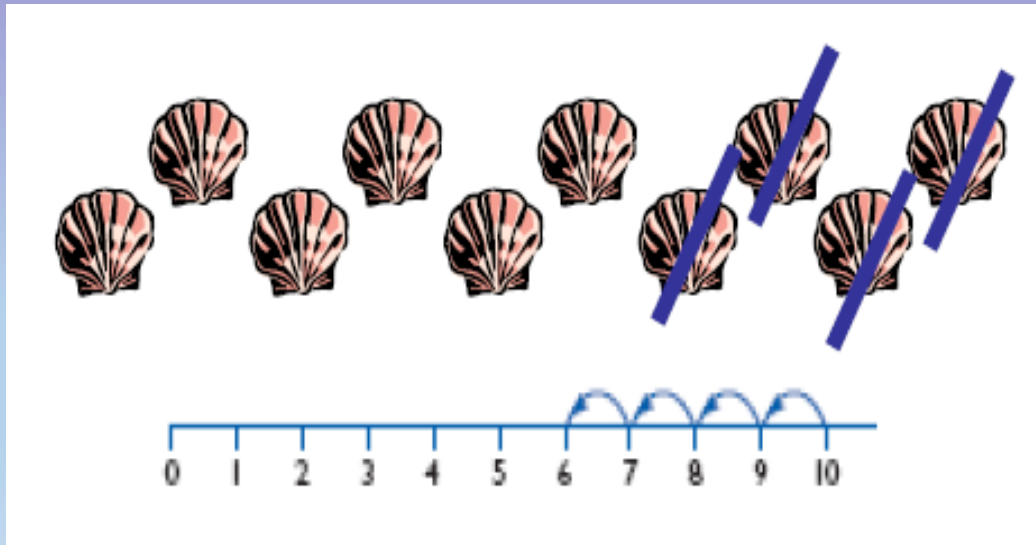
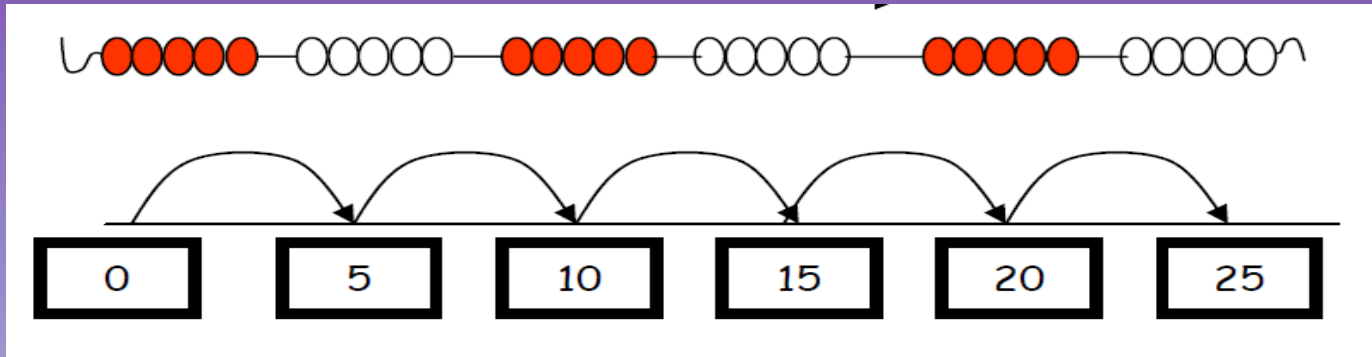
## Lower Key Stage 2 (Y3 & Y4)

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Fractions (including decimals in Y4)
- Measurement
- Properties of Shapes
- Position and Direction (Y4)
- Statistics

# Concrete Pictorial Abstract



# Addition progression

<http://gfletchy.com/2016/03/04/the-progression-of-addition-and-subtraction/>

## Addition progression

$$7 + 5 =$$

$$6 + 8 =$$

*Numicon, Bead string, Ten frame, structured number line.*

$$24 + 35 =$$

$$32 + 51 =$$

*Dienes, Arrow cards, Bead string, Bar model, unstructured number line, 100 square.*

## Subtraction progression

$$8 - 4 =$$

$$19 - 6 =$$

*Counters, Numicon, Bead string, Structured Number line, Bar model.*

$$47 - 21 =$$

$$35 - 17 =$$

*Bead string, Unstructured Number line, 100 square, Bar Model.*

## Multiplication progression

$$2 \times 5 =$$

$$4 \times 3 =$$

*Counters, Bead strings, Number lines, Arrays*

$$13 \times 4 =$$

$$15 \times 6 =$$

*Number lines, Arrays, Dienes.*

## Division progression

$$12 \div 2 =$$

$$15 \div 5 =$$

*Counters, Bead strings, Arrays (sharing and grouping)*

$$70 \div 5 =$$

$$42 \div 3 =$$

*Bead strings, Arrays, Number lines (grouping)*

Thank you for attending and taking part.