

What is Mathematics Mastery?

A guide for parents and carers.

Objectives:

- Explain and demonstrate how mathematics is taught in Whitehall Park School
- Understand what is meant by 'Mastery' in mathematics.
- Identify how fluency impacts upon achieving mastery.
- Increase confidence and understanding in supporting your child at home.

The Elephant in the Classroom

“Mathematics plays a unique role in the learning of most children – it is the subject that can make them feel both helpless and stupid. Maths, more than any other subject, has the power to crush children’s confidence, and to deter them from learning important methods and tools for many years to come.”

Jo Boaler

Professor of Mathematicians at Stanford

Positive encouragement

“When you are working with your child on maths it is important to be as enthusiastic as possible about maths.

This is hard if you have had bad mathematical experiences, but it is very important. Parents, especially mothers of girls, should never, ever say I was useless at maths! Research tells us that this is a very damaging message, especially for young girls.”

Jo Boaler

Aims of the National Curriculum

~~The new curriculum aims that all children:~~

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

What is “Mathematics Mastery?”

Mathematics Mastery programme:

-is a whole school approach to teaching mathematics.

It aims to:

-raise achievement for all pupils and to close the attainment gap.

-deepen pupils’ conceptual understanding of key mathematical concepts

Core belief:

- Success in mathematics **is possible** for every child, whatever their background or prior attainment.
- Mistakes are an opportunity to develop.
- Mathematical ability is not innate, and **is increased through effort**. Effort means being resilient and not giving up easily.
- Every child should achieve a strong foundation in mathematics, with no child left behind.

Mathematics Mastery Curriculum

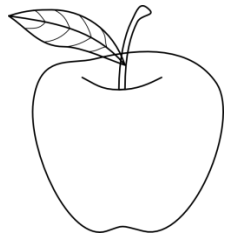
- Fewer topics but greater depth
- Developing an understanding about numbers and its place value through the use of objects and pictures before abstract numbers and letters (see sheet about concrete, pictorial and abstract approach)
- Problem solving is central
- Embedded Learning
- Slower and richer pace
- Focus on reasoning

Multiple representations

Concrete



Demonstrating
depth



Pictorial

Abstract

one 1

Concrete, pictorial, abstract

Concrete representation

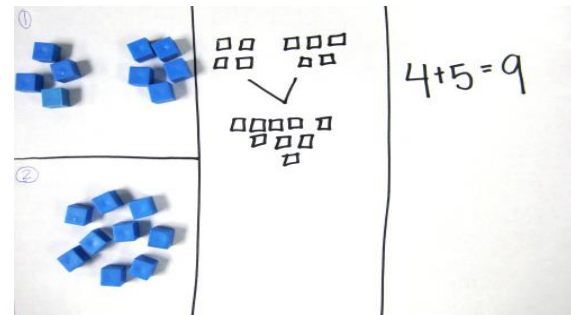
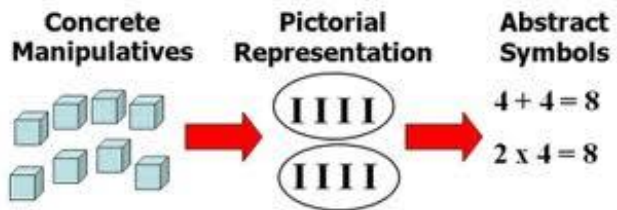
The enactive stage - a child is first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green ones or by sharing 12 biscuits amongst 6 children. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

Pictorial representation

The iconic stage - a child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of a division exercise this could be the action of circling objects.

Abstract representation

The symbolic stage - a child is now capable of representing problems by using mathematical notation, for example: $12 \div 2 = 6$



Reasoning and applying

- Maths needs to be based in real-life contexts.
- In order to develop a love of maths in children, we need to make sure we are not misrepresenting the subject as pages of calculations. Mathematicians describe maths as the study of patterns whereas students describe maths as a list of rules and procedures that need to be remembered.
- Talking in maths is extremely important!
- Children need to be explain what they have done and why they have done it.



Reasoning and applying

Sealed Solution

Stage: 2 ★ ★

A set of ten cards, each showing one of the digits from 0 to 9, is divided up between five envelopes so that there are two cards in each envelope. The sum of the two numbers inside it is written on each envelope:

7 8 13 14 3

What numbers could be inside the "8" envelope?

What does it look like in the classroom?

- 5 structured lessons per week
- 10-15min Maths Meeting (mental maths) every day

How will children's work be recorded?

- Task sheets
- Children's Maths Books
- Photographs

Please do ...



- Play (maths) with your child
- There are opportunities for impromptu learning in games with real people that you can't get from an iPad or DS!
- Let your child win or be better than you sometimes! Otherwise all they learn is that you are better at maths than them.
- Recognise that there is more than one way of doing calculations – You may have learned one method, but children are actively encouraged to seek out alternative methods in school and choose one which works for them, no matter how long winded.
- Be an actor! – Get excited about maths and your child will get excited too.
- Talk to your child about their learning, what they learn in their maths lessons each day.
- Use every opportunity to ask your child questions and to explain their reasoning to you.
- GROWTH MINDSET – everyone of us can master mathematics given the opportunity.
- Think and talk like a mathematician

Please try not to ...



- Don't expect them to understand after you've explained it once. – It is normal for a child to 'get it' one day, and then in a different context not know how to find an answer

Websites to use for practising fluency and other resources

- Family maths toolkit website
- Top Marks website
- LGFL
- Busy Things
- Nrich website
- Numberblocks

How would you represent number 6 using concrete resources?

Your turn!

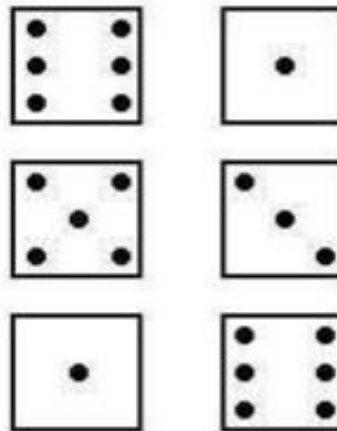
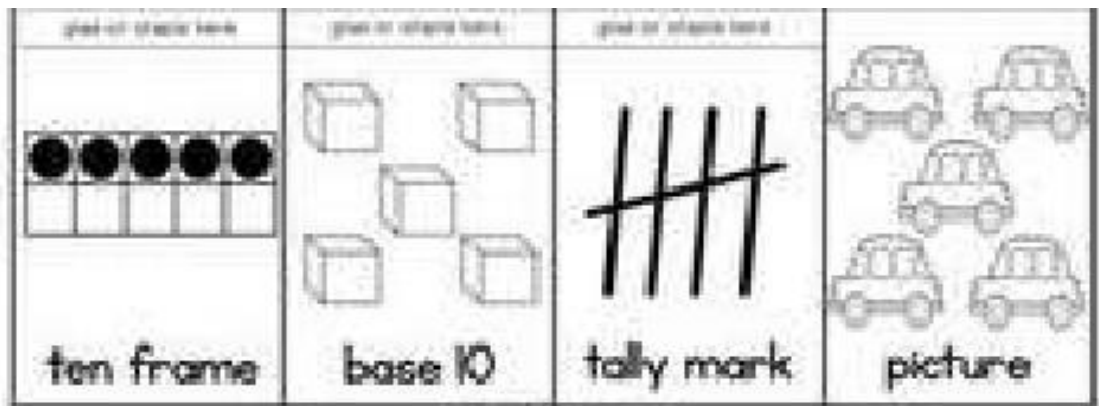
- Using the resources available, can you show the number 6?



6



How would you record 0-10 pictorially?



Solve

$$\underline{\quad} + 29 = 33 + 19$$

Solve

What is the sum of the numbers 1 - 100

ANY QUESTIONS?

Evaluation:

More of...