

What do we understand by fluency?

What does 'fluency' mean in the Primary National Curriculum?

Since the National Curriculum was implemented we have become familiar with the content of the National Curriculum as well as the aims (below, taken from the National Curriculum document)

Aims

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

In order to develop a greater understanding of these aims and to consider the 'fluency' aim in some detail we further explored phrases within the fluency aim to develop a shared understanding.

What could be the 'fundamentals of mathematics'?

- Number recognition with young pupils
- Place value and number sense
- Mental skills including number bonds and times tables
- Written methods carried out with strong underlying skills
- Fractions, decimals and percentages
- Links within areas of maths (for example place value and measures)
- Connections including depth and breadth of learning
- Pupils spotting connections and patterns
- Aspects that pupils need to be secure in to problem solve

What might 'varied and frequent practice' look like?

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| <ul style="list-style-type: none"> • Outside of maths lessons • Includes all areas of maths and different contexts • Includes recording • Includes verbal learning • Includes practical learning • Links to real-life problems • Involves application of learning to different problems and contexts • Links across areas of maths • Links across other curriculum areas eg science | <ul style="list-style-type: none"> • Open-ended activities • Daily practice • Reasoning • Different representations • Small logical steps • Applying in different ways including games and problems • Regular application: Mental skills, tables, number bonds |
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How might the ‘increasingly complex problems over time’ appear in each year group?

- Increase in cognitive demand within year group at the expected standard
- Pupils using what they know to solve calculations and problems
- Use of hands-on resources to model problems and strategies to aid understanding
- Increase in the number of steps within calculations
- Missing box questions requiring application and connections
- Problems requiring depth of understanding (rather than larger numbers). *This could include the type of questions in the National Curriculum Assessment Materials (NCETM)*
- Problems involving strategies including: Finding all possibilities and being systematic
- Linking and applying skills and concepts in a range of contexts
- Knowing methods and applying them to solve problems (rather than having to focus on the method itself)
- Unpicking problems in different contexts to apply previous skills / methods

What is ‘conceptual understanding’?

- Fully understanding processes and the reasoning behind them
- Understanding the how and why and being able to demonstrate or explain to someone else
- Use of a range of mathematical representations and language to represent and describe concepts
- Deeper understanding
- Making links by applying maths knowledge
- Application in different contexts
- Being able to apply and make connections
- Knowing how to break down concepts
- Making informed decisions about concepts. *For example choosing the most efficient mental strategy for problems*

What does ‘the ability to recall and apply knowledge rapidly and accurately’ mean?

- Understanding concepts so that pupils can apply accurately
- Making connections (especially between inverse operations)
- Recall of facts in different ways including missing numbers
- Using known facts when solving and applying in problems
- Choosing appropriate mental strategies
- Higher level thinking
- The ability to use what you know to work out something you don’t
- Applying general rules *For example when you multiply any number by 10*
- Being secure in place value and applying that knowledge
- Knowing when to use mental or written methods
- Having the knowledge ‘at their fingertips’

Breaking down the fluency aim from the National Curriculum enabled us to gain further understanding of this crucial aim for children’s learning in Mathematics