Developing deep understanding

Deep understanding of maths is developed by a coherent learning progression through the curriculum

What is deep understanding?

Having a deep understanding of maths means that learners can apply and communicate their mathematical knowledge in a range of contexts.

They can look for patterns and relationships, make connections, conjecture, reason and generalise. At all phases, a deep mathematical understanding comes from teaching which looks both backwards and forwards, and curriculum sequencing which includes coherent steps towards mathematical proficiency.

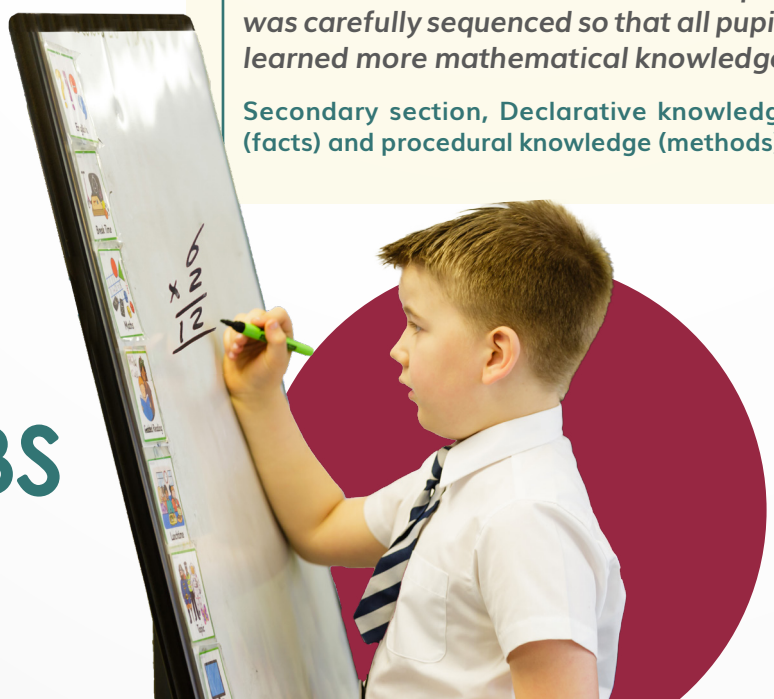
As well as having a coherent curriculum within a phase, teachers having an understanding of the maths that has been learned, and will be learned, is crucial. Teaching for deep understanding means ensuring that learners have a solid foundation of knowledge which builds on previous learning and enables connections to new concepts.

What does the 2023 Ofsted report, 'Coordinating Mathematical Success', say about developing deep understanding?

> ***All schools should make certain that teachers routinely check whether pupils have secure knowledge and understanding of prerequisite mathematics and address any gaps identified, before moving on to the next stage of learning. All schools should make sure that teachers regularly connect new learning to what pupils have learned before, including showing pupils how it connects with learning in other subjects.***
>
> Recommendations, Pedagogy and Assessment

> ***Moving on when pupils are not mathematically ready gives the illusion of progress but creates ever greater gaps that will take more time to address in the future. […] Some pupils would be better served by studying less, but securely learning more.***
>
> Discussion of the findings, p.11

> ***The majority of schools had identified core mathematical methods and approaches that they wanted pupils to be taught at the various stages of their learning journey. Most focused on selecting methods and approaches that were:***
>
> - ***'Forward facing', in that future learning would build on them***
> - ***'Backward facing', in that new learning was deepened because it built on what pupils already understood***
>
> ***In these schools, the teaching of mathematical methods and techniques was carefully sequenced so that all pupils learned more mathematical knowledge.***
>
> Secondary section, Declarative knowledge (facts) and procedural knowledge (methods)



How can teachers nurture deep understanding in those they teach?

From Reception to post-16, deep understanding is developed through teaching new concepts by building on what has been learned before, helping to reveal mathematical structures, and regularly checking understanding and addressing misconceptions.

Several Maths Hubs pathways support teachers and school leaders to create confident mathematicians with a deep and connected understanding of the maths they are learning.

Developing Fluency with Multiplicative Reasoning at KS3
This Work Group brings together teachers of Years 7 and 8 in a professional learning community. Participants explore effective ways to teach multiplicative reasoning, share strategies and use carefully-designed classroom resources and guidance materials to improve their teaching.

Securing Foundations at Year 7
For teachers working with those Year 7 students who have not met age-related expectations in maths, particularly those whose attainment is in the bottom 20-30% of the national cohort at the end of KS2, this Work Group offers access to high-quality resources designed by experts in the pedagogy and expectations of maths at both KS2 and KS3.

Supporting Students to Achieve a Level 2 Qualification in Maths
An opportunity for those teaching GCSE Maths resit and/or Functional Skills Maths, this Work Group is for teachers whose students will study up to Level 2 maths across secondary and post-16. Participants focus on developing transferable teaching techniques aligned to teaching for mastery so they can support students who need to study maths beyond age 16 to achieve a L2 qualification.

> ***Students have an increased confidence and resilience, and are more likely to try when something seems challenging.***
>
> Participant in Supporting Students to Achieve a L2 Qualification in Maths

> ***Participating has strengthened my own professional voice. […] The session focused on Year 6 into Year 7 has led to us establishing a Years 5-8 Continuity Work Group for our trust.***
>
> Multi-academy trust maths lead

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Coordinators of the Maths Hubs Programme