Coherence

What does coherence mean in the context of maths teaching and what can schools do to ensure their maths curriculum is coherent and well-planned?

What are the benefits of a coherent curriculum?

In the NCETM's Five Big Ideas in Teaching for Mastery, coherence draws together the other underpinning principles of variation, representation and structure, fluency and mathematical thinking.

As Hung-Hsi Wu (2011) explained, 'Mathematics is coherent; it is a tapestry in which all the concepts and skills are logically interwoven to form a single piece.' A coherent curriculum allows students to see connections between different mathematical ideas, which is crucial for problem-solving and conceptual understanding.

Research by Ball, Thames, and Phelps (2008) highlights that teacher knowledge plays an important role in ensuring curriculum coherence. Teachers need to understand both the mathematics they are teaching and the broader goals of the curriculum. This allows them to present mathematical concepts in ways that build on previous lessons and connect different ideas together.

What does the NCETM say about curriculum coherence?

For the NCETM's Director for Primary, Debbie Morgan, 'Coherence is about the sequence of learning and how that builds firm foundations. We need to start at a point that's accessible and then build the learning in small, connected steps. Taking the children on a journey and having those 'I get it!' moments due to the logical sequence.'

Carol Knights, the NCETM's Director for Secondary, adds that a consistent approach to teaching maths is essential, 'We want to avoid students who go from one teacher to another, and encounter completely different teaching approaches and sets of representations. We want them to have a seamless experience, within whichever phase of learning they're in. Teaching should link back to previous learning and should look ahead to future learning.'

What does the 2023 Ofsted report, 'Coordinating Mathematical Success', say about coherence?

> ***Primary schools should make sure that they identify and sequence small steps in the Reception Year curriculum [and they should make sure that] all pupils learn to apply facts and methods to wider problem-solving [and] geometry knowledge is sequenced throughout, rather than at the end of, each year's curriculum.***
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> **Recommendations, curriculum**

> ***Secondary schools should make sure that the curriculum specifies the mathematical methods that leaders want all pupils to learn, and that these form a coherent, 'forward-facing', base of mathematical knowledge rather than a collection of disconnected algorithms and tricks.***
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> **Recommendations, curriculum**

> ***A well-sequenced curriculum, and systematic teaching and opportunities for practice help pupils to become proficient in mathematics. This leads to success and motivation in the subject.***
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> **Summary of the research review**

> ***A well-sequenced path to proficiency, with the small steps identified, is important for all pupils and crucial for pupils with SEND. This helps pupils to keep up and reduces the need for catch-up support.***
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> **Meeting the needs of pupils**

How can schools ensure a coherent approach to maths from Early Years to post-16?

Maths Hubs offer a range of fully-funded collaborative projects, which schools can engage with to develop an approach to maths teaching that ensures curriculum coherence, between individual classes, across year groups, and spanning Key Stages and phases.

Mastering Number at Reception and KS1 focuses on developing pupils' fluency and number sense in Reception, Year 1 and Year 2. By using structured teaching strategies and manipulatives, schools build a strong foundation for mathematical understanding, which continues with **Embedding the Impact** in Year 3, to ensure all pupils transition smoothly into KS2.

Mastering Number at KS2 supports pupils in Years 4 and 5 to develop fluency and establish firm foundations in multiplicative relationships, which is essential for success in maths at secondary school.

Years 5-8 Continuity brings together KS2 and KS3 teachers and focuses on strengthening the transition from primary to secondary school, aligning teaching strategies across phases. To better support students who did not achieve age-related expectations at the end of KS2, **Securing Foundations at Year 7** equips secondary teachers with KS1 and KS2 subject knowledge and teaching materials to address gaps and support improved progress.

Schools can also engage in the **Teaching for Mastery Programme**, a rolling programme of support designed for **primary schools** and **secondary schools**, which provides collaborative opportunities for teachers to explore and embed mastery approaches in their schools, ensuring a coherent teaching approach that is fully sustainable for the long-term.

These are just some of the almost 40 fully-funded CPD opportunities available. Speak to your local Maths Hub today to find out how your school or college can get involved.

> ***I am confident that I am now sending children up to KS2 as mathematicians. They don't just know how to answer a question, they understand the underpinning structures and relationships.***
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> **Nathan Pow, Year 2 teacher and maths lead at Newlaithes Primary School in Carlisle, on Mastering Number at Reception and KS1**

> ***There's been a lot more coherence. Having that collaboration means there's a joint ownership of the department, of the scheme of work, and of moving the children forward and making their lives better.***
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> **Peter Kenrick, head of maths at Penwortham Priory Academy in Preston, on Secondary Teaching for Mastery – Sustaining**

> ***The impact has been greater consistency of knowledge, terminology and a wider understanding of a range of approaches. It has cemented knowledge, built upon prior learning in KS2, that was not there before.***
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> **Gavin Yates, Director of Maths at The Whitstable School in Kent, on Continuity Years 5-8**

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Coordinators of the Maths Hubs Programme