

Inclusion

Mathematics



Everybody learning!

When we use the phrase 'Quality First Teaching', we refer to key principles that underpin best practice. In this section, we will focus on the principle of **inclusive pedagogy**, addressing the values, attitudes and approaches that ensure mainstream classrooms are geared towards supporting those who find learning difficult.

Inclusive pedagogy is an approach to whole-class teaching that is accessible to **all learners**. It should enable learners to keep up, feel included, progress and be successful. This approach should foster an open-ended view of each individual's potential to learn and recognises the difference between individuals as a given and a strength. It challenges deterministic approaches that exclude certain learners from a positive classroom experience because of adverse labelling by ability, or by diagnosis.

As teachers we can feel disempowered by the expectation to teach learners with such a variety of needs.

However, we do not need to become experts in every SEND diagnosis to succeed. We do need to seek to know each learner, to find out how they learn best, and then seek to create classroom strategies that maximise their learning. By thinking about quality in this way, mainstream classrooms can become environments where teachers can plan, teach and assess for **all** their learners with equal confidence.

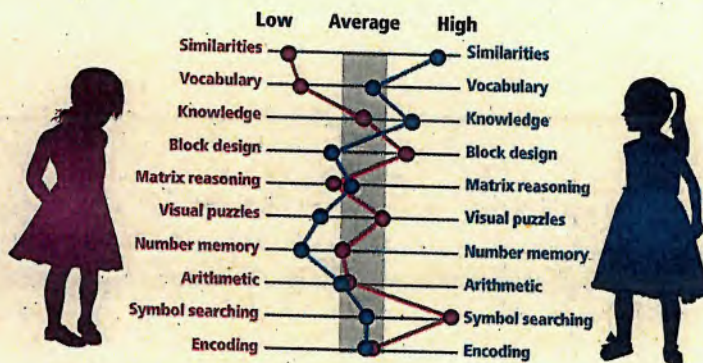
The notion of inclusive pedagogy is not a call for a return to a model of whole-class teaching where equality is notionally addressed by providing identical experiences for all. Instead, it advocates an approach whereby the teacher provides a range of options which are available to everybody. Human diversity is seen within the model of inclusive pedagogy as a strength, rather than a problem, as children work together, sharing ideas and learning from their interactions with each other. The inclusive pedagogical approach fosters an open-ended view of each child's potential to learn.¹

Why Inclusive Pedagogy is prerequisite for Quality First Teaching

We are moving away from an approach that views learners with SEND as outliers that always need to be catered for and taught differently. Separating learners with SEND out for numerous interventions or over-relying on teaching assistants to deliver teaching to a group of learners with identified SEND, can in fact be detrimental. Evidence tells us the most important contribution to improved outcomes for learners with SEND is quality teaching.²

We are also seeing an increase in the co-occurrence of needs exhibited by children and young people. Research tells us there are increasing numbers of learners in mainstream who demonstrate complex SEND profiles due to a number of factors (e.g., better neonatal care and more complex conditions affecting neurodevelopment).³ More and more learners have what might have been described as spiky or jagged learning profiles.

The new Education Inspection Framework (EIF) reflects this shift too. It no longer looks at SEND as a department or additional provision within the school, but reviews teaching of learners with identified SEND within each subject area and every classroom. It requires evidence of SEND teaching that permeates curriculum delivery, 'built in' not bolted on.



There is a new generation of children with complex learning needs, who do not fit neatly into an understandable category.⁴

Professor Barry Carpenter

What do we need to change?

We need to focus on academic engagement for learners with SEND to achieve genuine inclusion and strengthen learner achievement. Learners with SEND need access to the best teachers and the strongest teaching. Currently, many mainstream school processes focus on the social and emotional aspects of inclusivity rather than zooming in on the teaching and learning process.

Inclusive pedagogy can improve this. Responsibility for effective teaching and assessment of learners with SEND should not be the isolated preserve of the SENCO. Teachers are the key to progress. Teachers are generally supportive of the principles of inclusion, yet anxious about working with an increasingly diverse range of learners. Adopting an inclusive pedagogy offers a way of thinking about effective whole class teaching and meeting the needs of individual learners. Research has helped highlight the reliance on planning and teaching for the majority of learners who learn typically, and then doing something slightly different for the outliers: those at the top or bottom of the distribution curve (who are sometimes described as lower or higher attainers). Inclusive pedagogy highlights the flaws in this teaching, that default thinking of planning for most of the class and then doing something additional or different for some. 'Most' and 'some' thinking risks limiting our belief in what young people can achieve. Inclusive pedagogies encourage us to build in, not bolt on.

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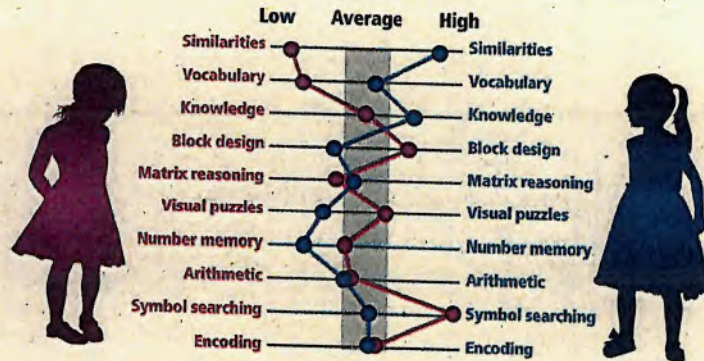
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Inclusive teaching and learning approaches

Let's move away from stereotyping and fixed-ability thinking about what learners with SEND can achieve. Where differentiated lesson planning leads to learners recognising, they are forever stuck on the red table for low prior attainers, or consistently given the bronze activities for in-class completion never the gold, (or the 'mild' never the 'spicy' or the 'hot') then we limit expectations of what these learners can achieve. Consideration of learners with SEND who find learning tricky must be core to planning and teaching, not peripheral.

It is tempting to talk about the challenge of SEND as a specific and distinct issue. Yet, far from creating new programmes, the evidence tells us that teachers should instead prioritise familiar but powerful strategies, like scaffolding and explicit instruction, to support their pupils with SEND. This means understanding the needs of individual pupils and weaving specific approaches into every-day, high-quality classroom teaching – being inclusive by design not as an after-thought.⁵

1. Ban the average

Banning the idea of 'average' is an important step towards adopting a more inclusive approach to teaching. Instead of quickly categorising learners with SEND as 'below average', the successfully inclusive teacher realises the notion of an average, above average or below average learner is **not helpful**. The inclusive teacher challenges that mindset that seeks to predetermine the capacity of each learner, replacing it instead with a **curiosity** about what the learner can achieve.

As teachers we should approach teaching with a sense of openness, looking to be surprised by our learners and what they can achieve. We cannot develop quality teaching unless (and until) we challenge this oversimplification.

2. Think about transforming learners' lives as the job

Reframe how you approach your role as teacher. It is one that transforms lives, rather than simply 'topping up' knowledge. Plan and teach based on the belief that futures are not predetermined by innate ability, and that every learner can make progress given the opportunity. Work with learners as co-agents in learning. Commit to nurturing trust between you as the teacher and your learners.

'Success for all ...depends in large part on a belief that children learn to high levels'.⁶

3. Difficulties in pupil learning are a professional challenge

As teachers we can be influential change agents in transforming schools if we regularly reflect on our pedagogical practices. Look for improvements that will help all learners reach their full potential. Barriers to learning simply present an opportunity to develop new ways of working, rather than a 'problem with the learner'. A complex learner presents a professional opportunity to learn!

4. Learners are pilots, not passengers

A study of 4000 fighter pilots to identify the 'average size' for cockpit design discovered that on a ten-point criteria, not a single one was the same on every dimension. These 'jagged profiles' are applicable to learners in the classroom. Difficulty with maths does not mean a struggle in literacy; poor working memory might not mean poor articulation. When you recognise these spikey or jagged profiles, there is less risk of labelling and a greater opportunity to identify learner potential.

5. Less deficit labelling, more ability profiling

Good teaching requires adopting an individual, holistic view of each learner. Be wary of labelling learners with their diagnosis or behaviour trait, or by assumptions of what they cannot do, particularly learners with SEND. Such labels reinforce stereotypes and lower expectations of what they can achieve. Instead of describing learners with autism as having difficulties making friends, or dyslexic learners as reluctant writers, profile learners by what they **can achieve** and how they **can learn**.

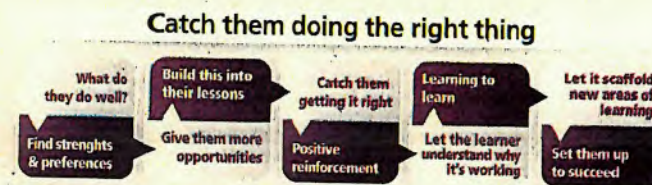
Catch yourself quietly if you label or limit a learner by the language you use, but positively reinforce yourself and your colleagues when remarks are made about what a learner can do (rather than what they cannot).

6. Ask better questions (be a detective in classroom)

Adopt an inquiry mind-set. This is about asking investigative questions around the learner. What do I know about how this particular child or young person learns? What are their strengths in maths and how do they differ in geography? What are successful hooks to get them interested? What motivates them to learn? What aspects of their learning behaviours need to be developed? This helps break the cycle of starting with questions about what we know about a learner's diagnosis or condition.

7. Catch your learners doing the right thing

Notice a learner's strengths and build on these, however small.



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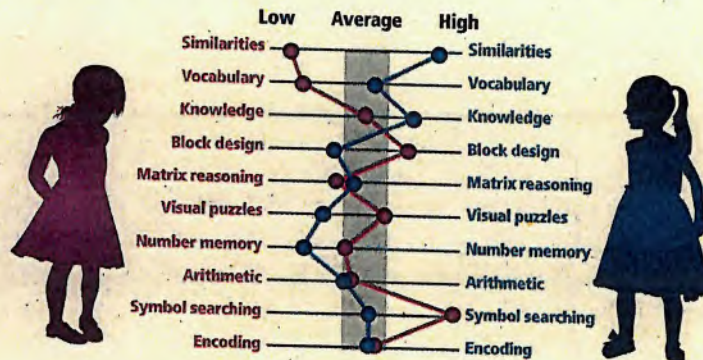
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Creating an Inclusive Environment

Maths lessons should not be silent. It is important learners feel able to work independently, but they should also work well alongside their peers. The best maths learning happens when learners can talk through their ideas with a teacher or a partner, and therefore it is good to encourage this productive discussion during lessons. When planning opportunities for talk, ensure that all learners have the support they need to access these discussions, which could include scaffolding such as sentence frames, visual support and/or peer partners.

It is also important all learners have had the opportunity to use concrete resources, such as bead strings or counters, to support their learning. Often this works best if a concept is introduced with concrete resources readily available for the entire class to use. Once learners have been shown how to use the equipment to support their learning, they can decide whether they wish to use it or not. Learners may need the support of the teacher in making this decision – some may cling to the resource for security, whilst others may feel embarrassed to use the resource if other learners are not.

As maths is a subject where often there is an 'objective' right or wrong answer, learners can lack resilience or confidence in their own ability if they feel as though they are consistently getting things wrong. Learners can also lack resilience and confidence due to having large gaps in their learning. It is important to ensure learners are given equal opportunities to learn core knowledge, so that they are less likely to make mistakes. Learners can also benefit from a culture where mistakes are embraced and viewed as a part of the learning process.

Linked to this, it is useful to point out, carefully, what a 'wrong answer' to a question could be, as this helps learners with lower confidence to demonstrate their understanding and develop their reasoning.



Curriculum Considerations

Key Stage 1

- Learners should have 1 to 1 correspondence when counting.
- Learners should develop automaticity in addition and subtraction facts to and within 10.
- Ensure learners have a concept of 'more than' and 'less than' and can describe the relative sizing of number.
- Encourage learners to represent numbers in many different ways, in pictures, as a calculation, in words.
- Ensure learners can explain the place value of 10s and 1s.
- Use resources such as tens frames, Numicon and base 10 blocks confidently, to support learning where needed.

Key Stage 2

- Ensure learners are secure with all times tables (by end of Year 4), as this acts as a foundation for other maths concepts.
- Learners should have secure understanding of place value, up to 10,000 and beyond.
- Learners should begin to apply their knowledge of number and written methods to reasoning problems.

The Main Principles of Mastery

The core principle behind mastery is that learners should develop a secure and long-term knowledge of mathematical concepts through carefully planned lessons, which gradually and strategically build on prior learning. This teaching style should be constantly revisiting and building on prior learning, helping to make connections and develop depth of understanding.

NCETM have broken down the key principles of mastery into five strands: Coherence, Representation and Structure, Mathematical Thinking, Fluency and Variation. These are useful to consider when planning a unit, to ensure all elements of mastery are covered.

How can I support learners who struggle with attention?

- When modelling, encourage learners to make jottings, or copy each step out, onto a whiteboard at the same time.
- Be flexible with how you deliver your input. It might not always be necessary to have all learners involved at once. Some learners could be completing an accessible activity independently at tables, whilst others are listening to the teaching input, and then they swap. This helps to keep inputs focused and short, maintaining the attention of those who struggle.
- Give learners a target number of questions to do – when working towards a goal, learners are more likely to be focused.
- Use behaviour-specific praise, where you specifically identify what the learner has done well, to motivate learners and encourage their sustained attention to the task.
- Incorporate some questions which appeal to a learner's interests, for example making questions about a particular character they like. This will help to maximise engagement and motivation.

How can I support learners who struggle with change and transition?

- Establish routines and expectations early in the year, ensuring certain transitions, activities and games are repeated regularly to increase familiarity.
- To inform assessment and planning, ask the learner how they found a concept or lesson, at the end of a session.
- Set a target amount of work to complete and prepare learners by giving a 5-minute warning before the end of the activity. Allow them to take a few extra minutes to finish off if they need it.

How can I support learners who lack confidence in their own mathematical ability?

- Send home photocopies of successful pieces of work to share with parents/carers.
- Pose open-ended questions to the class, which have multiple answers. Ensure all learners have equal opportunities to answer.
 - 'Odd One Out' is a great example of this kind of activity; Learners are presented with 3 different numbers on the board and are asked which is the odd one out and why. There is no 'right' answer to this question, and therefore it is accessible to all members of the class. Answers could include '10 is the odd one out because it's the only multiple of 5' or '8 is the odd one out because it's got two circles'. Being able to give an answer, no matter the complexity, helps to validate all learners.
- Mark learners' work in the moment, rather than at the end of the lesson. If the learner can see they are on track as they are completing a task, this will motivate them to keep going and will boost their confidence. Using this method also means you can correct and explain any mistakes as they happen, helping learners avoid embedding misconceptions.
- Ask learners to be a help in the lesson preparation process, e.g., selecting images which will be used in the maths lesson or asking to set up resources. This will help the learner to feel more comfortable as they begin the lesson.

The guidance in this document supports planning for learners with SEND by highlighting the most important concepts within the national curriculum so that teaching and targeted support can be weighted towards these. For further guidance, please refer to [Teaching mathematics in primary school](#).

Case Study

A child in Year 1, who did not have secure number sense, struggled to access the curriculum as they could not order or compare numbers between 1 and 20.

An intervention was set up where the child spent five minutes a day with a suitably qualified adult, working on ordering numbers. Some of the tasks included rearranging number cards, counting objects around the school, and spotting the missing number on a number line. It was found that this short, sharp intervention and daily focus on this one skill helped to improve their fluency and in turn, their access to the curriculum.

Case Study

A child in Year 6 struggled to access lessons alongside the peers in his class; in maths, his individualised learning targets were aligned with the Year 3 curriculum.

At the beginning of a new topic, in line with a mastery approach, his teacher reflected on his individual targets and prior attainment while planning the whole-class lesson. This process demonstrated that the child did not yet have the foundational skills needed to access the planned work in line with his peers.

To plan learning activities for the learner, aligned to the topic, the teacher then used formative assessment to identify particular skills within the topic as areas for the child to develop, e.g., adding multiples of 10 to any given number. Planning for the child then followed a format where he had focussed input from the teacher early in the week. He then repeated a similar activity independently for the following few lessons, with a review at the end of the week. Alongside planned learning activities, the child had the opportunity to play maths games alongside an adult or peer to build on foundational maths skills.

Strategies to Scaffold Learning

How can I support learners who struggle to retain vocabulary?

- Be conscious of the range of vocabulary learners are exposed to. There are often several different words for one mathematical concept (e.g., add, sum, total, plus). Learners will need these words to be defined each time a new one is introduced and may need questions to be rephrased to understand their meaning. Learning should be documented in the classroom and referred to within and across lessons, for example on a working wall.
- Before a concept is introduced to the whole class, take time to familiarise chosen learners with new vocabulary and its meaning. This will give those learners greater confidence, as they feel confident when this same idea is introduced to the whole class.
- Use of visuals and actions can help to remind learners of the meaning of a word, or how it links to a mathematical symbol.

How can I support learners who struggle to access lessons because of literacy difficulties?

- If solving word problems, consider deploying an adult or pairing a learner with a confident peer to read the questions aloud to relieve the pressure of decoding the language.
- Some learners may benefit from 'drawing' the word problem, so that after a question is read, the learner has an image to refer to. This can enable a learner to 'see' the information they are missing, and decide what they need to work out, so that they can solve the word problem.
- Use of concrete resources and visuals is extremely important in helping learners to access questions.
- Ensure worksheets are laid out clearly and learners are not overwhelmed with a page of questions. Some learners may require different resources, which could include plain paper or enlarged square paper, to access set work.

How can I support learners who need additional time to develop conceptual understanding?

- Use intervention time to play games that consolidate a new or tricky concept with an adult.
- Use pre-teaching to give some learners a head-start.
- Have clearly laid out worked examples for these learners to refer to when working independently.
- Ensure tasks are scaffolded so that the learner can focus on the planned objective, for example prewrite information which is non-essential to the learning (date, learning intention), so the learner can focus directly on the skill being taught.
- Use representations learners are familiar with to transfer and connect similar ideas. For example, in Year 1, they use a tens frame that shows ten ones is equal to one 10, and then in Years 4 and 5 a tens frame could be used to show ten tenths is equal to 1.

How can I support learners who struggle with number fluency?

- Help learners to practise fluency outside of maths lessons, e.g., during transitions the whole class could count in 5s as they move from the carpet to their tables.
- If a particular fluency skill is required in a lesson (e.g., recalling the 5 times table), ensure learners practise this skill at the start of the lesson. During the retrieval practice, if needed, learners can have concrete resources or visual support, such as a times tables square, to remind them of number facts.
- Use games as part of regular intervention, to practise basic number skills and help retain fluency facts. Examples of maths games can be found on Cambridge University's [NRICH Project](#).

