



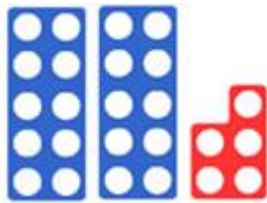
Welcome to the final Primary Magazine of the school year. With an eye on planning for next year, we visit a school that is already using the NCETM's Mastery Professional Development materials to plan Y1 lessons, and we take a look at how imprecise language can cause confusion for young learners. Don't forget all previous issues are available in the [Archive](#).

This issue's featured articles



[NCETM mastery materials are making an impact: are you using them?](#)

If you are already drawing up plans for September – have you had a look at the NCETM/Maths Hubs Professional Development materials? They include teacher guides and videos, as well as PowerPoint slides for use in the classroom, and are now complete for Y1 and Y2 in Number, Addition and Subtraction. It is intended that material for all year groups to begin teaching this segment will be available for the start of next term. In this article we talk to teachers who are already using the materials, to find out how it's going.



[Linguistic Ambiguity](#)

Ben Hookes has been teaching for a decade, and through his classroom experience and professional development work with teaching assistants, has come to understand just how misleading some commonly-used classroom terminology can be – particularly for the youngest learners of maths. Here, he takes us on a light-hearted tour of some examples, emphasising the importance of clearly-defined terms.

And here are some other things for your attention:

- The national Maths Hubs Network has finalised the shape of the [2018-19 professional development opportunities](#) for teachers. There is a full range of Work Groups for schools wanting to adopt, or further develop, teaching for mastery, as well as opportunities to focus on subject knowledge (teachers or TAs), SEND, Early Years or Y5-8 continuity. Those involved in leading professional development for other teachers can access support through local networks and national accreditation.
- The [UK Mathematics Trust \(UKMT\)](#) produces materials for the prestigious Maths Challenges for secondary school students, but they also produce [Primary Team Maths Challenge materials](#) aimed at Y6, which can be freely accessed. The questions are beautifully written and could be just what you need for promoting team working in the last few weeks.
- If you are planning ahead for September, as well as reading [this issue's article](#) about our [PD materials](#), you might like to keep an eye on which units have been published (Number, Addition and Subtraction strand is complete for Y1 and Y2, with Y3 units coming out all the time...). Also useful are the ever-popular [Assessment Materials](#) with helpful exemplification and ideas for Working at Expectation and Greater Depth. And for Early Years and Y1, our suite of [Numberblocks Support Materials](#) is being added to over the next few weeks.
- If you are reviewing school maths policies, you may like to look at our [Calculation Guidance](#) or our [Marking Guidance](#).
- Two more headteachers talk about the success of teaching for mastery in their schools: one in a [video interview](#), the other in our latest [podcast](#).

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NCETM mastery materials are making an impact: are you using them?

Want to consolidate your subject knowledge, plan your maths lessons effectively and be assured that your pupils will grasp concepts with confidence? Use the [NCETM Professional Development materials](#), say Kathryn McGregor and Michelle Addison at Lammack Primary School in Blackburn.

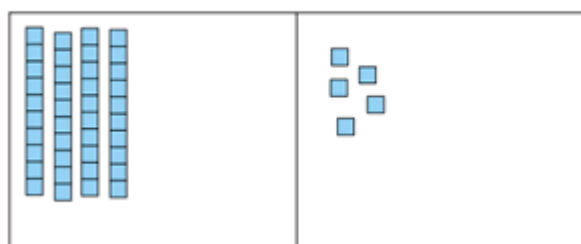


There are observations that apply to most teachers as the academic year draws to a close. Firstly, they are already thinking about what they will be teaching next year and how to engage and inspire a new class. Secondly, they never have quite enough time to do everything they want, including planning - in advance - whole series of lessons which are challenging, fun and well-pitched for all learners.

This is where the [professional development \(PD\) materials](#) come in. Already created for Number, Addition and Subtraction for Years 1 and 2, and with more to follow for Y3-6 by September, the materials comprise a teacher subject guide and animated PowerPoint slides. The guide breaks down content into Teaching Points, and exemplifies each with details of representations, classroom routines, stem sentences, suggested resources and clear instructions, so that children grasp concepts securely. The PowerPoints illustrate the topics in the guide and provide an engaging visual anchor for pupils' learning. Instead of being a lesson plan or set of resources, the materials ensure that teachers' own professional development

needs are foregrounded. Consequently, teachers deliver maths lessons having deepened their subject knowledge, and give pupils the best chance of building secure mathematical understanding.

'Show me forty-five.'



During a recent visit to Lammack Primary School in Blackburn, we had the chance to see the materials in action. Lammack is a large and successful primary school with approximately 500 pupils on roll. In the lesson we saw, Michelle Addison took her Year 1 class through numbers 20 to 100, exploring the relative size of two-digit numbers. Learning included the class counting together in tens, exploring place value, and drawing pictorial representations of their understanding. After 30 years teaching other year groups, Michelle started teaching a Year 1 class for the first time in September 2017, and Kathryn McGregor (Assistant Head and Maths Lead) recommended the NCETM PD materials as a way to think about approaching the class's maths teaching. Michelle explains her approach to planning prior to using the materials:

"Before using these PD materials, I would teach a topic and move on. Children's books had lots of pages of practice with examples of the concept being taught, but now there is far more room for the children to explain their reasoning in full sentences."

The lesson Michelle teaches reflects how the materials inform her enhanced approach to teaching mathematical concepts. Children take small steps informed by her input including her questions, support from TAs (who have also been trained by Kathryn to refer to the PD materials), and representations and manipulatives suggested in the teacher guide. In addition to the PowerPoint as a visual stimulus, children are equipped with number lines, Dienes, individual white boards and true/false cards, and make use of these throughout the lesson to develop and express their reasoning. They are already familiar with a range of resources, and Michelle chooses carefully which are most appropriate for each lesson.

Early in the lesson, Michelle asks the class to compare 52 and 28, and to say which number is greater and why. Immediately children start picking up Dienes and scanning their fingers along number lines. One child stands up and volunteers his response: 'I know that 52 is greater than 28'. Following the guidance in the materials to 'discuss the reasons' for their answers, Michelle asks the class 'Is he right? Hold up true or false. Who can explain why 52 is greater than 28?' Her planned questions come from annotating the PD materials prior to the lesson, so she feels confident that she will meet the needs of all pupils in the class, including any that may struggle to grasp the concepts first time, and any ready for further challenge.



Kathryn first introduced Michelle to the materials in conjunction with whole school training on teaching for mastery, reasoning, problem solving, and the opportunity to watch a Shanghai teacher during the England-China exchange. Although time was initially invested in becoming familiar with the materials' content and approach, planning has since become quicker and easier as the small steps paid off. What is it about the materials which makes planning so much better for Michelle?

"They provide an accurate mathematical vocabulary for me to use with the pupils. I know that my language and pedagogy must be accurate in order to avoid creating any misconceptions for the children. The PD materials ensure that what I am saying, including the exact stem sentences I use, delivers exactly what my class need to know."

Kathryn also watches the lesson and is thrilled at how well the PD materials are supporting the teaching of maths at Lammack. Year 1 teachers have been encouraged to co-plan, using the materials, and to trust them to deliver. Kathryn explains:

"They are the best thing we have used to deliver and prepare maths lessons. Using the Year 1 resources has already had a positive impact on progress and attainment, with more children now at greater depth and expected standard than on entry to Year 1."

The children have also responded positively to the mastery approach, enjoying their maths lessons and showing increased confidence when tackling new concepts. No pupils feel left behind. All are supported through same day intervention – during the lesson and while the children are at break, Michelle looks at their work and identifies any who require additional support or explanation prior to their next maths lesson.

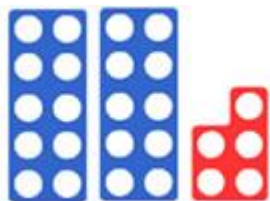


So, do Michelle and Kathryn have any advice for teachers starting to use the PD materials to plan their own maths lessons?

"These materials are not about just printing out a worksheet, nor are they a lesson plan. Teachers need to read and understand them in advance, but the time spent on this is paid back many times over when pupils quickly and confidently grasp the concepts being taught, because teaching is highly effective and subject knowledge is secure. We can't wait for the rest of the materials!"

If you would like to use the materials for your own maths planning, they're [available to download](#). Spine 1 materials (Number, Addition and Subtraction) will be available for all year groups soon.

You can also listen to Debbie Morgan and Clare Christie, the two lead authors, discuss the philosophy behind the PD materials, and how they are intended to be used, in a recent [NCETM podcast](#).

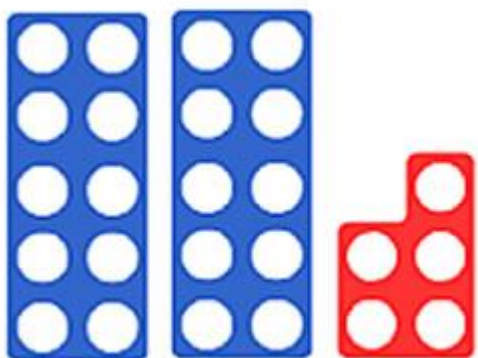


Linguistic Ambiguity

Ben Hookes is a primary teacher in North Devon. He is maths subject leader for Combe Martin Primary School, currently on secondment as Assistant Head at Clinton Church of England School.

This article grew from Ben's work with TAs across North Devon, developing understanding of the use of concrete, pictorial, abstract representations in maths. Through discussions with TAs, he began to recognise examples of how language can trip children up, and offers his personal reflections here.

During my decade as a primary teacher, I have been fortunate enough to teach every year group beyond EYFS starting in Year 6 and working my way down to Year 1 and no, I wasn't demoted. To all KS2 teachers, I can tell you that you learn a lot – you have to; and fast. But one thing that took some time to understand was just how ambiguous language can be for younger learners and how, without any intention whatsoever, children misinterpreted (or rather, I misunderstood how they would interpret) the mathematical concepts that I was teaching them. Take, for example, this image:



I would regularly present this to my Year 1 children alongside the question, "How many tens and how many ones?" Now to you or I, who have long since accomplished our understanding of place value beyond two digits, the answer the teacher is looking for is "Two tens and five ones." Congratulatory applause all round. Only, it isn't. The answer is two tens and one five. You see it took me eighteen months of teaching Y1 children, staring at their quizzical faces, wondering if I had slipped into Swahili...again, before a quiet, nervous voice dared to challenge my pedigree and called out,

"There aren't any ones. Ones are orange."

Drop-jaw moments like this stop you in your tracks – and for good reason; the problem was that I had been thinking like an adult, with an expansive vocabulary and a sound understanding of the concept I was teaching. This wasn't the first time I had encountered two-digit numbers. I understood the shades of grey in my language, the subtle shift in nuance. For the children on the other hand, this was brand new and much more literal.

From this point on, I understood that if I wanted the children to get a firm grasp of our base-ten number system, the representation of ones should be just that: an amount of ones as opposed to one amount of some other number (cue the Dienes blocks). It's blindingly apparent; well, once a six-year-old points it out to you.



Since this moment, I have been alert to such 'lexical ambiguity' in maths and you'd be surprised how often we may well be unintentionally creating confusion for some learners.

Let's look at the addition problem $2 + 3$, for example.

"So, who can tell me what 2 add 3 is?"

you ask the class. Are you sure that the children haven't misheard the word 'and' instead of the word 'add'? Does it matter, as long as the answer is correct? And even if they did mishear (or worse you did actually say 'and') and then went on to make a logical connection, surely 'and' is just a synonym for 'add' at worst. Except for if the question asked is,

"What is the product of 2 and 3?"

It is no wonder to me that my year 5's, despite constant reminders and regular practice still found this a difficult concept to unlearn. This problem is not confined to upper KS2, either. Answer these: What two digits make up the number 23? So what is 2 and 3? You get the point.

Subtraction does not get off the hook either. In many schools I have heard KS1 teachers ask the question, "Which number do we start with when we subtract?" Cue a well-rehearsed chorus of "The bigger one!" Also cue a group of future KS2 learners who persist with error-strewn column subtractions where the lower digit in the column has a higher value than the upper one. Wouldn't it be much more useful if we used language to describe subtraction, and indeed all operations, in functional terms:

"What is our starting number? What are we going to do to it?"

This would certainly help to also eliminate the staffroom debate over whether 5×3 is five threes or three fives. We start with five and we multiply it by three (notice too, the correct use of the mathematical operator's name – the word 'times' offers no clue as to which number the function applies to and is, at best, a euphemism for 'lots of').



Take a moment and you will start to notice these ambiguities everywhere. *Count forward, count back, count on, count up, count down.* Spot the odd one out. The answer: the one that inexplicably uses a preposition. You can almost see the faces of confusion in early learners. “Count on what? Do you want me to get on the table?” And what precludes it from having an antonym like the others (presumably count off)?

Here’s another. The use of the word minus to simultaneously mean subtract and negative just makes the teacher sound like they’ve acquired a temporary stammer: “What is 6 minus minus 8?” Even my auto-correction tool dislikes the repetition! It is unclear and confusing.

In my mind, maths co-ordinators have a duty to be aware of these lexical ambiguities and any others they notice, and to write into their calculation policies, simple, specific and consistent linguistic norms, just as they have simple, specific and consistent images and algorithms.

Maths is a universal language and yet our own mother tongue often serves to confuse and shroud the simple truths of this wonderful science. As teachers, we should remember that our learners are children at the very start of their journey. Teaching points need to be as simple and as accessible as possible. If we don’t remember what it is like to be a child, if we don’t see the world as children do; if we don’t think like them, then we will struggle to help them access their own child-world.