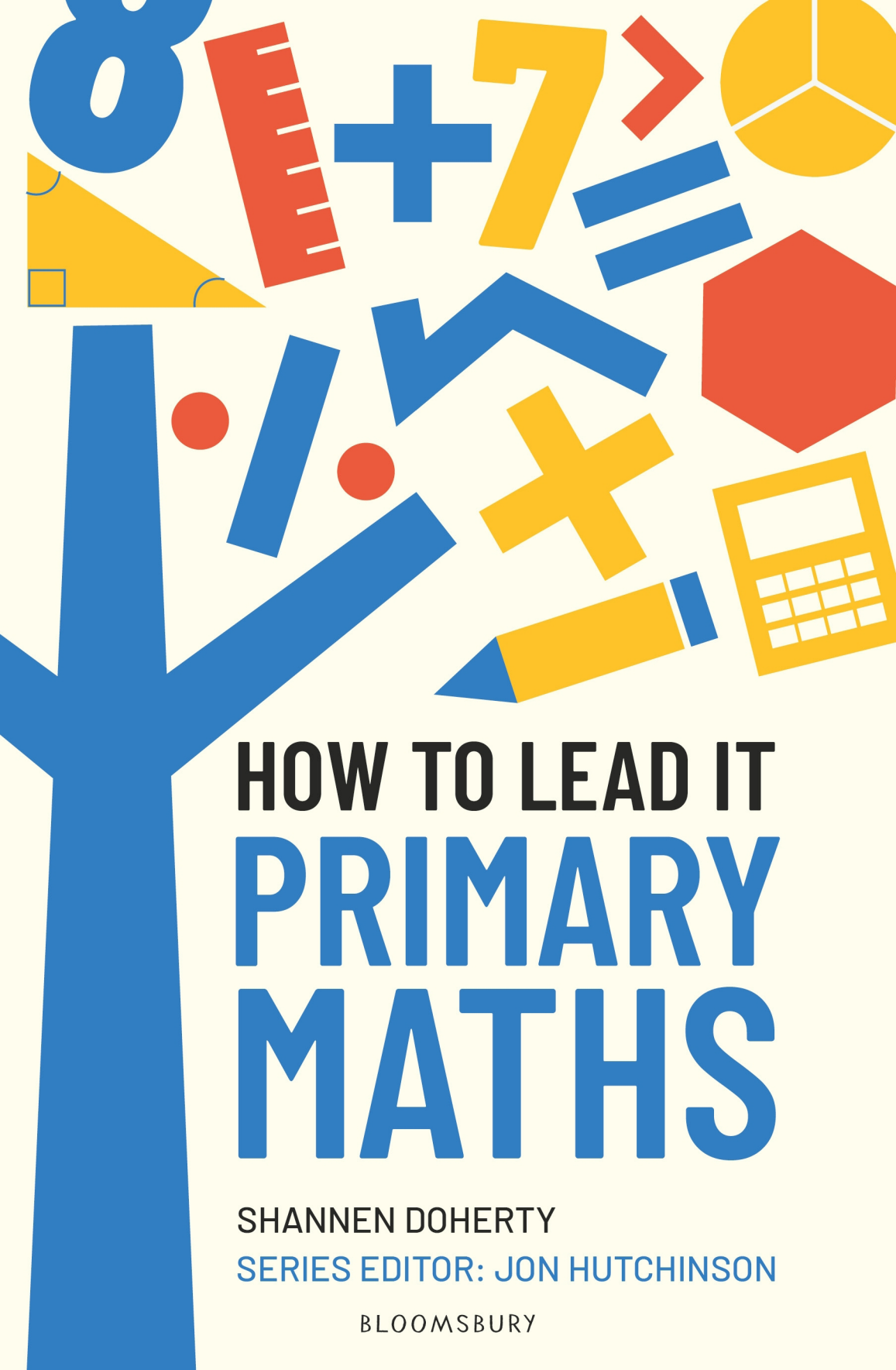




HOW TO LEAD IT PRIMARY MATHS

SHANNEN DOHERTY

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Contents

- 1 Leading maths** 7
- 2 Getting the best from research evidence** 19
- 3 School culture and attitudes** 33
- 4 Progression and curriculum structure** 45
- 5 Fluency** 61
- 6 Reasoning** 77
- 7 Problem solving** 95
- 8 Models, manipulatives and structures** 113
- 9 Variation** 127
- 10 Vocabulary and stem sentences** 137
- 11 Assessment** 151
- 12 Writing (and using) purposeful maths policies** 167
- 13 Implementing change** 179

Bibliography 198

Index 203

1 Leading maths

Leading primary maths is one of the most exciting roles you can take on in school. Whether you're stepping into subject leadership for the first time, building on previous experience or even looking ahead to the future, this book is designed to inspire you, challenge you and make you think.

From the moment I started my teacher training, I aspired to become a maths subject leader. I knew I wanted to share my love and enjoyment of the subject with colleagues, but I also knew I needed to understand the complexities and challenges of being a subject leader, especially of a core subject like maths. I've spent years exploring how to make maths teaching accessible, effective and exciting for every pupil. From leading my own school's curriculum to supporting others in refining theirs, I've learned a lot of lessons along the way!

This chapter will explore the importance of maths in primary education, the National Curriculum in England and what it says about maths, the role of a maths leader and how this differs to leading other subjects, and the key end points and outcomes in primary maths.

The importance of maths in primary education

Maths is a cornerstone of primary education. It is vital that we get it right!

Early interactions with maths, such as recognising pattern, understanding shape and counting, are crucial in developing a sense of number. When pupils engage in mathematically-rich tasks from a young age, it lays the foundation for encountering number later on, prepares them to tackle more complex concepts as they progress through school, and promotes positive attitudes towards the subject.

A strong foundation in maths can lead to success and enjoyment in STEM (science, technology, engineering and maths) subjects and other subjects like geography. In an average primary school year, pupils will participate in daily maths lessons, weekly science lessons, and regular DT and geography lessons. Coming to these lessons with the appropriate knowledge of number, statistics, shape and measure will increase success and therefore motivation.

In addition to all of the above, maths is fun. We have the huge privilege of teaching maths to our pupils every day and showing them just how interesting it can be. While I'm not suggesting we make every maths lesson into a party, we can absolutely make sure pupils enjoy what they are learning.

Understanding the primary maths curriculum

Looking at the aims and component parts of primary maths can give us more context on our role as the maths subject leader. Effective primary maths teaching is likely to have many of the same principles and practices, but the specifics of different countries' curriculums may vary. As a subject leader, your role requires you to be well versed in the curriculum to ensure your school is meeting its statutory obligations. Let's consider the National Curriculum in England (DfE, 2013) as an example. This has evolved over three decades and is the result of experts in maths thinking deeply about the why, what and how of maths teaching and learning.

The Purpose of Study says:

'Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.'

(DfE, 2013, p. 99)

If we are honest about our teaching practice, I wonder how often we push 'the beauty and power of mathematics' in a world where we have a limited time to impart a lot of knowledge. If we can see our curriculum through the lens of maths' beauty and power, we can create opportunities and experiences that will foster that 'sense of enjoyment and curiosity'. Maths truly is a beautiful subject. Look at Fibonacci spirals in nature, the symmetry of snowflakes or the fractals in the fronds of a fern. There is so much good to unpack in our curriculum and it is your role as a subject leader to demonstrate this to your staff, pupils and families. We know that there is a lot to teach, but if we rush through like a never-ending conveyor belt, we run the risk of missing the best bits. We should be

empowering our teachers and their pupils to hit pause every so often and really dig into the beauty of the subject. The National Curriculum in England seeks to make pupils:

- fluent in the fundamentals of mathematics through varied practice that develops conceptual understanding
- able to reason mathematically through conjecturing, generalising, justifying and using mathematical language
- able to solve routine and non-routine problems by using a range of approaches (DfE, 2013).

It is important that you have a clear understanding of these terms as a maths subject leader so that your colleagues can be just as clear. You will want to consider how you approach these areas both in your curriculum and in the day-to-day teaching of maths. These areas each have their own chapter later, but it is worth us defining the terms now before we consider how best to develop them in our own schools.

Fluency

At its heart, fluency is the ability to manipulate number and apply skills in multiple contexts. It's also about being able to select the most appropriate method from a toolkit of approaches to solve calculations. We are in danger of fluency becoming synonymous with the rapid recall of facts, which is undoubtedly important to mathematical understanding, but not the most important.

Reasoning

Reasoning involves thinking mathematically, using what is already known to make logical links to solve problems. In a blog about fluency, reasoning and problem solving, Neil Almond (2025b) said, 'mathematical reasoning is the bridge between fluency and problem solving. It allows pupils to use the former to accurately carry out the latter.'

It is vital that we don't see reasoning as just a question that requires an explanation, or worse a selection of questions that only the pupils with high prior attainment can answer in a lesson. Reasoning is not a style of question. It is a way of thinking and working to solve problems that can be developed in every pupil.

Problem solving

Just as with fluency and reasoning, there are misconceptions around what problem solving is in maths too. Problem solving is not just ‘word problems’. In fact, these often test fluency, for example a ‘problem’ like *Jamie has baked 25 cookies. Luca has baked 17. How many more cookies has Jamie baked than Luca?* This word problem requires pupils to see the structure of $25-17$ within the question rather than requiring a particular problem-solving strategy. Problem solving is how we apply conceptual understanding and procedural fluency to answer unfamiliar problems.

Foster (2019) demonstrates his view of how problem solving relates to fluency and reasoning in his pyramid model where fluency in facts, procedures and concepts sits at the bottom, with mathematical reasoning above it and problem solving at the top.

Problem solving is ‘the most important goal of all’ (p. 8), but this doesn’t mean that fluency and reasoning are to be sped through to get to problem solving. Fluency is the foundation of mathematical reasoning and problem solving, and therefore deserves time to be learned and practised to automaticity.

The role of a primary maths leader

Your role as a maths leader is a varied one and is often done alongside an almost full teaching timetable. Because of this, the task can feel overwhelming at times. It is always worth reminding yourself that you aren’t a superhero, and you have limited time, so don’t be hard on yourself! Hopefully, you can relish the chance to have a strategic vision over the direction of maths in your school and enjoy the role.

Mary Kennedy (2016) identifies five persistent problems that teachers face: portraying the curriculum, enlisting student participation, exposing student thinking, containing student behaviour and accommodating personal needs. These are problems that teachers face continually and are never completely ‘done’. As a maths leader, you might consider what your own persistent problems are. These are likely to be the same, or similar, for every maths leader, regardless of where your school is, what has been done up until now or what is on your school improvement/development plan. Potential areas for persistent problems might be:

- curriculum development
- resourcing
- monitoring teaching and learning
- supporting colleagues.

Curriculum development

The maths leader is the person in school who will design or choose a curriculum or scheme of work. Alongside senior leaders and teaching staff, decisions around curriculum come to you. You may have an embedded scheme of work, written your own curriculum, need a new scheme of work or want to supplement your current curriculum with additional resources. Whichever position you are in, you will want to know what is going well, and what does and doesn't work for teachers and pupils about the current curriculum. Even an embedded curriculum or scheme of work needs reviewing and adjusting to meet the changing needs of the school.

In Chapter 4, we will consider how your role as a subject leader impacts the organisation and progression of the curriculum and timetabling decisions. While there are lots of subjects to teach, we want maths to have the profile in school that it deserves!

A huge part of curriculum development work maths leaders do is developing the subject knowledge of teachers and teaching assistants (TAs) so that they can confidently and effectively deliver the curriculum and support pupils' learning. There may be gaps in knowledge because of a change in a scheme of work or a change in staff, and your role requires you to train staff to put them in the best position possible for your pupils. Subject knowledge might be understanding the big objectives, breaking them apart into small steps and understanding how they connect to other parts of the curriculum, or it might go right down to the specifics of which representation or method to use based on what others use across the school.

Resourcing

For teachers to feel able to teach and pupils able to learn, we need to ensure that they are well-equipped for them to do so. As a primary maths subject leader, managing resources is a vital aspect of your role in ensuring high-quality teaching and learning across the school.

Resources could be physical or online. Here are some of the resources you could be responsible for managing:

- manipulatives
- textbooks
- online maths learning platforms
- online quizzing platforms
- teacher-facing websites
- online testbases.

It is likely that you will be responsible for ordering resources that align with the curriculum and support effective pedagogy. It can be tempting to go onto education resource websites and order one of everything, but you will want to sit with your teachers and discuss the key resources that are needed. Instead of a scattergun approach, think about what you want your pupils exposed to throughout their primary school experience.

You will also need to consider how best to organise these resources. Will they be in classrooms? Is there a maths cupboard? Do you need to store some resources in classrooms as they will be used more frequently and others in a cupboard for particular topics? Clear, accessible storage systems can empower teachers to use resources confidently and efficiently.

It is not enough to just order and organise resources. We must ensure that our teachers and teaching assistants know how to use them. Make them part of your regular maths professional development (PD) sessions so that teachers can see them in action. For example, when delivering PD on teaching place value in numbers with up to four-digits, ensure each table of teachers has base 10 equipment to manipulate in the session, building and partitioning numbers with up to four-digits. Or, when training staff on teaching multiplying fractions, demonstrate to them how to fold a piece of paper to show this.

Monitoring teaching and learning

'Monitoring' can feel like a loaded word depending on how you and your colleagues have experienced it in the past. It is vital that monitoring activities are done with the intention of evaluating the *impact* of the curriculum, teaching and assessment to improve the learning for the pupils in your school. It is worth discussing this with your senior leaders. It could be argued that replacing the term 'monitoring' with 'evaluation' might send the right message to staff. Across each term, you are likely to conduct learning walks, pupil voice, teacher

voice and book looks with pupils or teachers. These should always be done in a supportive and developmental manner. ‘What can I learn from this?’ is a key question to keep asking yourself so that it informs your next moves and develops you as a leader. Monitoring, or evaluating, teaching and learning is never about checking up on staff or telling them off; it is about understanding what is going on in your subject and school.

You may want to ask staff or parents and carers to facilitate their children completing an online pupil voice survey to get a range of responses. This might look something like Figure 1.1.

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
I enjoy maths lessons.	☐	☐	☐	☐	☐
Maths is an important subject.	☐	☐	☐	☐	☐
I understand what I am learning in maths.	☐	☐	☐	☐	☐
My teacher sets challenging tasks.	☐	☐	☐	☐	☐
I know what to do when I am stuck.	☐	☐	☐	☐	☐
I feel like I am making good progress in maths.	☐	☐	☐	☐	☐

Figure 1.1 Example pupil-voice survey

The benefit of an online survey is that the results are collated for you, and you can begin to look at the spread of answers across year groups or the school, which might look like Figure 1.2.

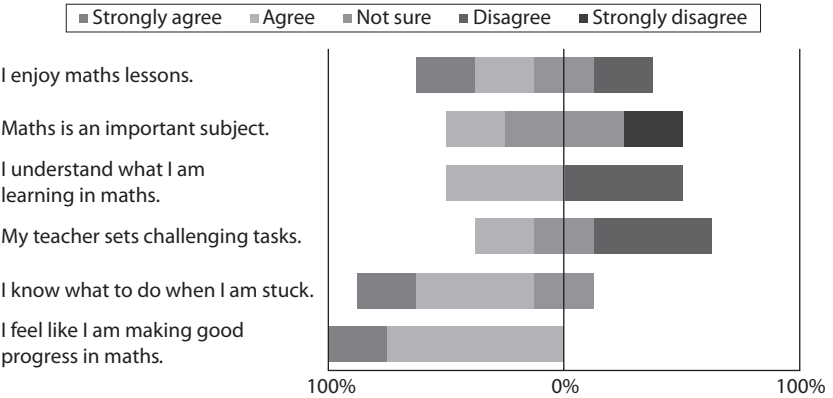


Figure 1.2 Bar chart showing results of pupil-voice survey

While an online survey definitely has a purpose, it is also worth doing more in-depth pupil voice with small focus groups from across the school. Here are some example pupil voice questions:

- What does a typical maths lesson look like?
- Can you show me something you are proud of in your maths book?
- What have you learned recently?
- Do you think you are getting better at maths?
- What do you enjoy about maths lessons?
- Is there anything that you don't enjoy?
- How do you get help when you are stuck in maths?
- How do you know you are doing well in maths lessons?
- What does your teacher do to help you learn more?

The answers to these questions can lead to rich discussions with pupils from Early Years Foundation Stage (EYFS) up to Year 6; they will give you more specific feedback than just an online survey and they will inform your next steps for PD. In your next maths PD session, you could have a slide on the screen sharing a few quotes from across the school as your colleagues arrive – this generally puts a smile on people's faces because we all know children come out with the best things!

Supporting colleagues

Effective subject leaders empower their colleagues to be more effective teachers. You can draw from a range of methods for supporting colleagues: whole staff professional development, coaching, training, collaborative planning or team-teaching. Each of these will serve a purpose to improve maths teaching and learning in your school.

You will, hopefully, have plenty of opportunities to lead professional development sessions with your colleagues linked to your subject development plan, and there are examples of how to structure PD sessions throughout the book.

You might also develop a coaching model for maths teaching where you drop into lessons focusing on an agreed area and then engage in a coaching conversation with the teacher. By focusing on bite-sized, incremental changes that feed into a wider goal, you can improve a teacher's practice at a greater pace than if you were only delivering whole-staff training.

In some cases, you might join planning, preparation and assessment (PPA) sessions with other year groups so that you can model effective planning and preparation, and collaborate with your colleagues in a more focused environment. You may also then work with particular teachers through team-teaching where you go into their classrooms and teach alongside them.

The big O

I won't say too much about Ofsted, because this book isn't a guide to get you through an inspection! However, it would be silly not to mention Ofsted. No doubt Ofsted will be on your mind as a subject lead. However, having been through multiple inspections, I can honestly say that the best way to prepare for Ofsted is to know your subject well, understand how your subject is enacted and understand the impact being achieved. That's exactly what this book aims to provide guidance with.

Interview on the role of a maths leader – Louise McLaughlin

Louise is an experienced senior leader and primary maths leader having worked in schools in London, Surrey and East Sussex.

Working as a maths subject lead is a joy and a privilege. The subject is high-stakes and should be high profile in any school, so it needs careful and constant attention. The main purpose of the role is to provide leadership and management for maths in order to secure high-quality teaching of a clear and robust maths curriculum, making effective use of resources so that standards are raised and outcomes are improved. Basically – find out how well maths is being taught and learned, and then make these two things even better!

I have been the maths subject lead in my current school for almost a year. The first thing I did when joining the school and taking on the role was to create a baseline. I needed to get to know what was happening with maths across the school. This took the form of looking at the school improvement plan and the maths action plan, as well as a document known as the school's 'guide' to maths. We plan and teach from the

White Rose curriculum scheme, which ensures that we are covering the National Curriculum objectives for maths across the school from EYFS to Year 6. I already knew that outcomes were below the nationally expected standard for attainment in maths, and I analysed the school's most recent maths attainment and progress data to find out more and identify any particular areas of focus.

Once I had this high-level overview, I was able to start the job of action planning to move forwards. It is an integral part of leading the subject to be able to work with senior leaders confidently and effectively. I maintain communication with the senior leadership team (SLT) over what is happening with maths at our school, which has led to a relationship of trust. The leaders know that I am a proactive leader, and I know that they will support my work. One of my main foci has been providing clarity over the timetabling and lesson planning expectations for our teachers. There had been a different scheme used a few years ago, and some parts of the school's maths guide had become muddled. Teachers in our school now know exactly what to teach and when to teach it, including the additional fluency sessions which we have timetabled in order to develop pupils' numerical and computational skills appropriate to their age and stage.

During a typical term, I undertake a combination of leadership activities, such as leading subject knowledge and pedagogical knowledge development sessions with staff; talking to pupils about their maths learning; visiting lessons; and supporting planning. I use the school's monitoring schedule to plan my weekly activities and always make time for teachers to talk to me about maths. I am so passionate about the subject and am never too busy for a maths query!

One of the most easily overlooked but potentially very impactful aspects of maths leadership is, I would say, building and working with a network. I am lucky enough to work as part of a Multi-Academy Trust (MAT), so the maths network is well established, and I have built a relationship with the trust maths lead. However, I am also part of our geographically local maths hub, which provides great opportunities to share ideas and ask for support from people outside of your immediate sphere, who are likely faced with very similar challenges in their own schools. The importance of maths as a subject means that stakeholders will want and need to talk to you as a maths lead, so being able to talk about your subject in your school will always stand you in good stead.

Looking ahead, I want to help teachers to improve their approaches to adaptive teaching so that lessons are inclusive of children's varying needs and prior attainment. The maths curriculum is full and it can be hard to see the wood for the trees. It is essential that we focus on a mastery approach for all children so that the current gaps in attainment not only do not widen, but start to close. Every child can learn maths, and every teacher can love teaching it!

How this book can support you

Throughout this book, we will explore different aspects of primary maths provision in more detail, giving you a strong foundation from which to teach and lead the subject. You will find:

- examples of best practice across phases
- a mixture of fictional and real case studies for further exemplification
- suggestions for staff professional development
- reflection questions to help you structure your thoughts and identify next steps
- follow-up reading and resources if you want to explore a particular area further.

In the next chapter, we will draw together insights from cognitive science with evidence related to the practice of maths teaching. We then look at how you can take an evidence-based approach yourself.

In Chapter 3, we will look at maths mindsets at school and, in Chapter 4, maths curriculum design. You will then find detailed chapters on specific areas of the subject: fluency (Chapter 5), reasoning (Chapter 6) and problem solving (Chapter 7).

Next, we look at the importance of judiciously using models and representations (Chapter 8), variation (Chapter 9) and maths-based language (Chapter 10). Chapter 11 focusses on assessment in maths.

We will finish with guidance on ensuring consistency in your school's approaches (Chapter 12) and tips on implementing improvement and change (Chapter 13).

Questions for reflection

- What is the vision for maths at our school? How does this align with the wider curriculum vision?
- How do we communicate the beauty, power and enjoyment of maths to staff, pupils and families?
- How does attainment in maths compare with other subjects in our school, and nationally?

Explore further

- 'Becoming a maths lead' Chapter 23 of *Mastery in Primary Mathematics* (2020) by Tom Garry
- Ofsted's *Coordinating Mathematical Success: the Mathematics Subject Report* (2023)
- The National Centre for Excellence in the Teaching of Mathematics' *Taking on the Role of Maths Lead in a Primary School* (2022)

Chapter summary

- Maths is a cornerstone of primary education. It supports STEM and other subjects, with strong early experiences correlating to later achievement.
- Subject leaders should champion the enjoyment and beauty of the subject while ensuring that fluency, reasoning and problem solving are integral. We should consider how these three aims are defined and embedded, avoiding misconceptions and promoting their interconnected nature in teaching and learning.
- Leading primary maths gives you the chance to have a strategic vision for curriculum design, resource management, PD, mentoring and monitoring, ensuring a coherent and effective approach across the school.
- A good grasp of your subject and its delivery is essential when engaging with Ofsted or other accountability processes, even if this is not the sole focus of your role. You can use pupil and teacher voice, book looks and learning walks as tools to evaluate the impact of your subject.