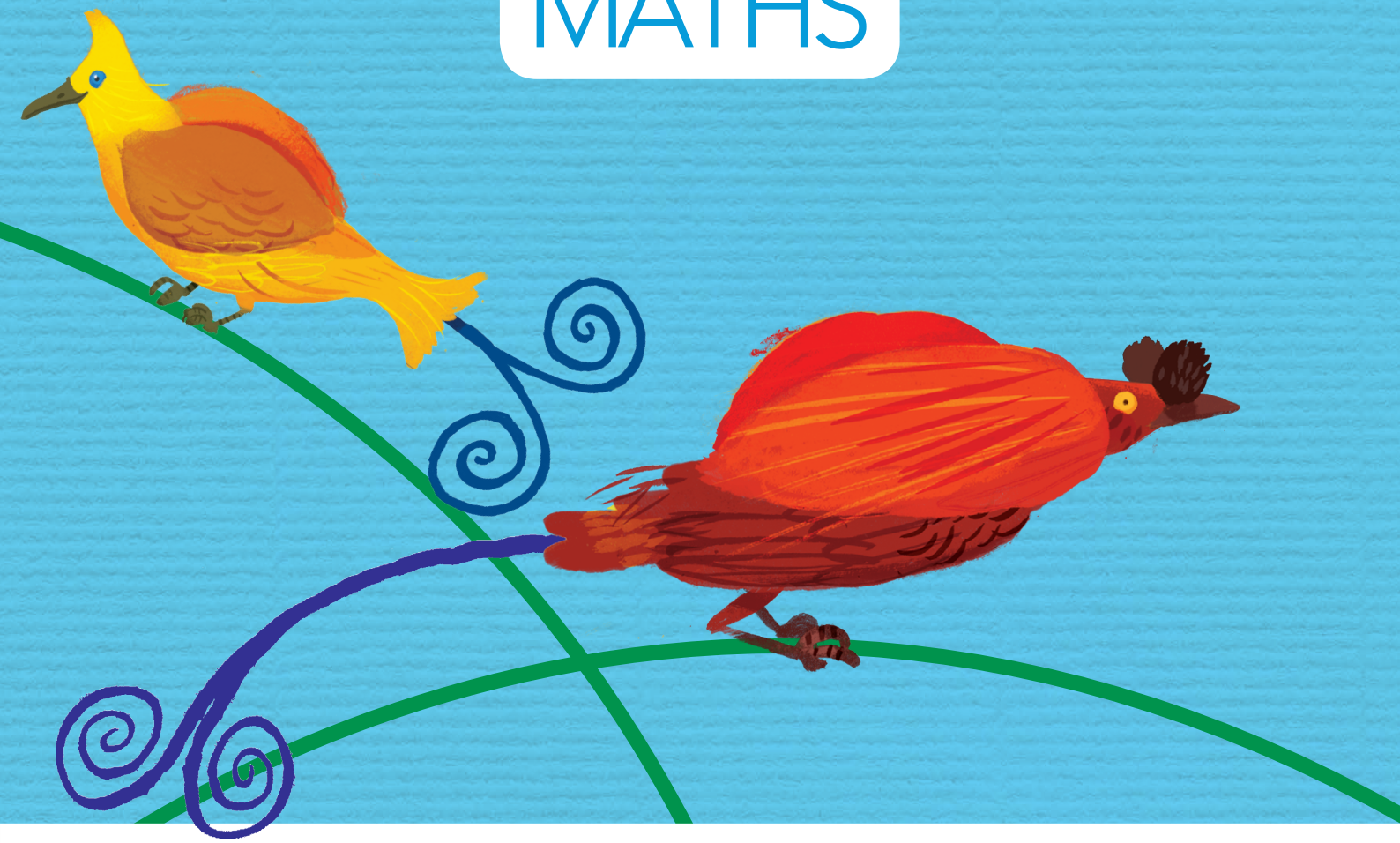
INSPIRE MATHS



GETTING STARTED GUIDE 2

Practical support to help you implement Inspire Maths

OXFORD

INSPIRE MATHS

GETTING STARTED GUIDE 2

Inspire Maths consultant and author
Dr Fong Ho Kheong

Rebecca Holland Julie Mitchell Bernie Westacott

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www.oxfordprimary.co.uk/inspiremaths

Contents

Introduction to the Getting Started Guide

Welcome to the *Inspire Maths* Getting Started Guide. This guide has been written especially for UK primary school teachers to support you in successfully delivering the *Inspire Maths* programme. It is designed to equip you with a deep understanding of the *Inspire Maths* approach and the practical tools for successfully implementing *Inspire Maths*, helping to raise standards in the teaching and learning of mathematics.

The Guide starts with a **Proof of impact and research base** section, explaining the programme's positive results both in Singapore schools and internationally. We outline the research and trialling that have been carried out and embedded to create a world-class textbook. Since the publication of *Inspire Maths* in 2015 in the UK, an independent report by the University of Oxford has attested to the positive impact that *Inspire Maths* has had in schools, and we share the results of this report with you. This section also draws on the experience of UK schools that have been using *Inspire Maths* over the past few years. Teachers describe the impact they have experienced from teaching with the programme, how they have seen a rise in their children's mathematical ability, and also how they have witnessed an increase in their children's confidence and enjoyment of mathematics. Finally, teachers give testimony to how using *Inspire Maths* has dramatically improved planning, teaching and assessment in their classrooms and their own confidence in teaching mathematics.

The section on **High achievement in mathematics and the importance of high-quality textbooks** looks at the research and design behind high-quality textbooks, why they are important, and how the features of *Inspire Maths* demonstrate its position as a high-quality textbook. We appreciate that it is important for you to understand how high-quality textbooks can be used to support a mastery approach in the classroom, and this section will show you the benefits of using *Inspire Maths* as your textbook programme.

The **Pace, progression and fidelity** section gives teachers guidance on pace, and demonstrates the step-by-step progression through a specific concept. It shows how *Inspire Maths* uses a highly-scaffolded learning framework that builds and consolidates knowledge to reach deep understanding. References to the medium-term planning charts and learning objectives will help you to plan and understand the time that needs to be spent on a topic. This section also explains how to use the Pupil Textbooks, Practice Books and Assessment Books together, in order to consolidate and apply understanding. This guidance will help you to prepare your year's teaching, by understanding your starting point and where you are aiming for by the end of the academic year.

The **How to teach with *Inspire Maths*** section is your practical guide through all the teaching and learning material, demonstrating how the theoretical approach fits with the practical work in the classroom. It outlines the *Inspire Maths* approach, before giving specific examples of how to teach with the different elements of the programme. It also offers support and suggestions for struggling learners and quick graspers, same-day intervention and using the assessments.

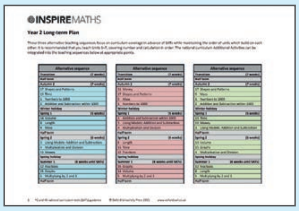
Guidance on how the 'National curriculum in England: mathematics programmes of study' relates to *Inspire Maths*, and how to ensure that you teach all the Key Stage requirements, is covered in the **How does *Inspire Maths* relate to the National Curriculum?** section. This highly-practical section has examples from *Inspire Maths* 1–6, to demonstrate how you can teach with *Inspire Maths* and be confident about covering all of the National Curriculum objectives by the end of Key Stages 1 and 2.

Finally, the **Further support for successful implementation** section directs you to the wealth of extra resources available on *Inspire Maths Online*. This includes videos, mixed-age planning guidance, interactive whiteboard toolkits, assessment trackers and beginning-, middle- and end-of-year assessments, which match age-related National Curriculum expectations.

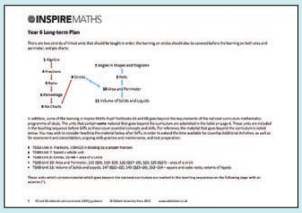
We hope that you find this Getting Started Guide a useful and practical support to implement *Inspire Maths* successfully in your classroom.

Teaching with *Inspire Maths*

This chart demonstrates how *Inspire Maths* resources work together to support teachers in delivering the primary 'National curriculum in England: mathematics programmes of study'. To ensure that sufficient time is spent focusing in depth on fundamental concepts, the levels of *Inspire Maths* may cross over year borders. Moving at the right pace for your children ensures you spend the necessary time to develop and embed skills and understanding. By following the programme, including the Additional Activities available online, you can be confident that all relevant curriculum objectives will be covered by the end of each Key Stage.

Year 1 (age 5–6)	Year 2 (age 6–7)	Year 3 (age 7–8)
Inspire Maths 1 • Getting Started Guide • Teacher's Guide A and B • Pupil Textbook A and B • Practice Book A, B, C and D • Assessment Book	**Inspire Maths 2** • Getting Started Guide • Teacher's Guide A and B • Pupil Textbook A and B • Practice Book A, B, C and D • Assessment Book	**Inspire Maths 3** • Getting Started Guide • Teacher's Guide A and B • Pupil Textbook A and B • Practice Book A, B, C and D • Assessment Book
INSPIRE MATHS ONLINE		
Beginning of year / Middle of year / End of year Assessments	Beginning of year / Middle of year / End of year Assessments	Beginning of year / Middle of year / End of year Assessments
Further support for all your teaching and planning needs is available on *Inspire Maths Online*	INSPIRE MATHS Year 2 Additional Activities Year 2 National Curriculum 2014 Additional Activities	INSPIRE MATHS Year 3 Additional Activities Year 3 National Curriculum 2014 Additional Activities
	 Year 2 and Year 6 National Curriculum tests (SATS) guidance	

The Pupil Textbooks for *Inspire Maths* may cross over year borders

Year 4 (age 8–9)	Year 5 (age 9–10)	Year 6 (age 10–11)
Inspire Maths 4 • Getting Started Guide • Teacher's Guide A and B • Pupil Textbook A and B • Practice Book A and B • Assessment Book	**Inspire Maths 5** • Getting Started Guide • Teacher's Guide A and B • Pupil Textbook A and B • Practice Book A and B • Assessment Book	**Inspire Maths 6** • Getting Started Guide • Teacher's Guide A and B • Pupil Textbook A and B • Practice Book A and B • Assessment Book
Additional resources: CPD videos, Simmering Skills, transition materials, planning guides and more (on www.oxfordowl.co.uk)		
Beginning of year / Middle of year / End of year **Assessments**	Beginning of year / Middle of year / End of year **Assessments**	Beginning of year / Middle of year / End of year **Assessments**
INSPIRE MATHS Year 4 Additional Activities Year 4 National Curriculum 2014 Additional Activities	INSPIRE MATHS Year 5 Additional Activities Year 5 National Curriculum 2014 Additional Activities	INSPIRE MATHS Year 6 Additional Activities Year 6 National Curriculum 2014 Additional Activities
		 Year 2 and Year 6 National Curriculum tests (SATS) guidance

Resources available on *Inspire Maths Online* to ensure that you meet National Curriculum Key Stage objectives

Foreword by Dr Fong Ho Kheong

Inspire Maths was introduced to the UK in 2015 and is an adaptation of the maths programme that I developed in Singapore, *My Pals are Here!*. This highly regarded mathematics programme has been used by Singapore children since 2001 and is currently being used in 80% of Singapore schools. Singapore schools have frequently ranked at the top of widely cited global studies, such as the Trends in International Mathematics and Science Study (TIMSS 2015) and the Programme for International Student Assessment (PISA 2015) (see page 9).

My Pals are Here! has found huge international success. Fifty countries have adapted mathematics materials based on the programme in print, digital and Professional Development and it has been translated into eight different languages.

I am delighted with the success *Inspire Maths* is having in raising standards of teaching and learning and promoting mastery in the UK. We have seen this impact in many different ways: for example, through a year-long independent academic study that explored the impact of the *Inspire Maths* programme; through the rise of Advocate Schools across the UK who report on how their teaching and learning has been transformed; and through the sharing of good practice by these Advocate Schools to the wider teaching community. This has translated to improvements in performance and confidence, with children working at greater depth as a result of using *Inspire Maths*.

The success of this programme can be credited to years of careful development and review, working with educators and academics, culminating with *My Pals are Here!* being approved by the Singapore Ministry of Education.

Because *Inspire Maths* is directly adapted from *My Pals are Here!*, which has been through this rigorous review process, the organisation of the topics does not always match the 'National curriculum in England: mathematics programmes of study'. However, you will see from this Getting Started Guide that by following the full programme and accessing the resources available on *Inspire Maths Online*, you are able to deliver the National Curriculum for Key Stages 1 and 2. *Inspire Maths* is structured around a mastery curriculum which is designed to help children see connections across topics, deepening their conceptual understanding. This thoughtful organisation of the topics also provides opportunities for the application and extension of fundamental concepts once children have learnt them; again, deepening children's understanding and mastery of these concepts.

Since *Inspire Maths* is the *My Pals are Here!* programme in its entirety, it will equip you with the tools to deliver high-quality teaching and to improve standards in your school.
I wish you all the best in using *Inspire Maths* to transform your children's understanding and attainment in mathematics.

I am confident that you will find the Getting Started Guide the best place to start.

Dr Fong Ho Kheong

Principal author and consultant for *Inspire Maths*

PISA Results: Maths [1] 2015 (2012)		
Rank	**Country**	**Score**
1 (2)	Singapore	564 (573)
2 (3)	Hong Kong (China)	548 (561)
3 (6)	Macao (China)	544 (538)
4 (4)	Taiwan	542 (560)
5 (7)	Japan	532 (536)
6 (1– as Shanghai)	Beijing-Shanghai-Jiangsu-Guangdong (China)	531 (613 – as Shanghai)
7 (5)	South Korea	524 (554)
8 (9)	Switzerland	521 (531)
9 (11)	Estonia	520 (521)
10 (13)	Canada	516 (518)
11 (10)	Netherlands	512 (523)
12 (22)	Denmark	511 (500)
13 (12)	Finland	511 (519)
14 (21)	Slovenia	510 (501)
15 (15)	Belgium	507 (515)
16 (16)	Germany	506 (514)
17 (14)	Poland	504 (518)
18 (20)	Republic of Ireland	504 (501)
19 (30)	Norway	502 (489)
20 (18)	Austria	497 (506)
21 (23)	New Zealand	495 (500)
22 (17)	Vietnam	495 (511)
23 (34)	Russia	494 (482)
24 (38)	Sweden	494 (478)
25 (19)	Australia	494 (504)
26 (25)	France	493 (495)
27 (26)	**United Kingdom**	**492 (494)**
28 (24)	Czech Republic	492 (499)
29 (31)	Portugal	492 (487)
30 (32)	Italy	490 (485)

1 Data taken from http://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf

Proof of impact and research base in *Inspire Maths*

International tests

Inspire Maths was introduced to the UK in 2015 based on the huge success of *My Pals Are Here!* in Singapore, and internationally, where it has been translated into eight different languages and adapted in fifty countries. The evidence of hard data in the PISA and TIMSS studies supported this decision. TIMSS (Trends in International Mathematics and Science Study) is designed to help countries all over the world improve student learning in mathematics and science, whilst PISA (Programme for International Student Assessment) studies literacy in three competence fields: reading, mathematics, and science. These studies collect educational achievement data and provide information about trends in performance over time (see **Foreword by Dr Fong Ho Kheong**, pages 8–9).

Dr Fong Ho Kheong cited the 2012 PISA Survey in his Teacher's Guide Foreword to *Inspire Maths*. Singapore children continue to be at the top of world rankings for achievement in mathematics according to the 2015 PISA Survey, and 2015 TIMSS ranking tables. Crucially, the data for high and low performers shows that the systematic, consistent approach to teaching for mastery in Singapore improves outcomes for *all* children, not just the high performers. A highly supportive, highly developed and structured, research-based textbook is of central importance to the teaching and learning of mathematics, and therefore the success of children, as you will see in the following section, **High achievement in mathematics and the importance of high-quality textbooks**.

Inspire Maths impact study

A number of international research studies have shown the educational effectiveness of programmes that follow the Singapore approach to teaching mathematics but, until recently, there had been no comparable study in the UK. In 2015–2016, an independent year-long study by the Department of Education, University of Oxford, entitled *Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England*[1] followed 576 Year 1 children for one school year. These were some of the first schools to implement both *Inspire Maths* and the 2014 English National Curriculum. By looking beyond children's attainment in mathematics, this experimental study had a broader scope than many other research studies. Changes to teacher practices and children's attitudes towards mathematics were also included in this study.

1 Hall J., Lindorff A. and Sammons P., *Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England; Findings from a Mixed-Method Randomised Control Trial*. (Department of Education, University of Oxford, Oxford 2016): https://ore.exeter.ac.uk/repository/handle/10871/24265

Using data from age-appropriate versions of the Progress Test in Maths (PTM)[2] mathematics tests aligned to the National Curriculum introduced in September 2014, the study's key findings were that:

- *Inspire Maths* can help Year 1 children make significantly more progress in mathematics; large gains were observed after two terms
- *Inspire Maths* promotes Year 1 teaching practices (concrete–pictorial–abstract approach [CPA], variation theory, deep conceptual understanding, teaching for mastery) that are well known to be more effective for children's progress in the long term.

Teachers noted a number of key benefits and challenges to themselves, children and schools when implementing *Inspire Maths*. These were quite consistent regardless of whether a teacher began implementing *Inspire Maths* in September or in January.

- Benefits to classroom practice were noted immediately following initial professional development training workshops. Secondary benefits were then observed over the course of the year.

In addition:

- Teachers were positive about the *Inspire Maths* materials and approach as well as the support provided by Oxford University Press.[3]
- Teachers reported that the programme boosted children's motivation and engagement, and that *Inspire Maths* was used creatively and flexibly.

James Hall, lead-author, and now Lecturer at the University of Exeter, said:

> Overall we found positive evidence that *Inspire Maths* benefited children's mathematics achievement and supported teachers' professional development. This boost to progress was surprising because children had only been in a classroom setting for a short period and because it often takes time to embed new teaching approaches.[4]

2 PTM, GL Assessment, 2015, http://www.gl-assessment.co.uk/products/progress-test-maths

3 Hall J., Lindorff A. and Sammons P., *Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England; Findings from a Mixed-Method Randomised Control Trial.* (Department of Education, University of Oxford, Oxford 2016): https://ore.exeter.ac.uk/repository/handle/10871/24265

4 University of Exeter, 'Research reveals that "Singapore" approach to teaching maths can work in UK classrooms', 2016: http://www.exeter.ac.uk/news/featurednews/title_550537_en.html

Inspire Maths Advocate Schools

Among the schools using *Inspire Maths* in the UK, reports of rising maths attainment, backed by SATs results, are continuously fed back to Oxford University Press. The *Inspire Maths* Evaluation by Oxford University included comments that teachers wanted to see examples of successful lessons. To meet this need, schools demonstrating high-quality *Inspire Maths* teaching are invited to become Advocate Schools. The purpose is to offer head teachers and maths leaders who are considering using *Inspire Maths* for their own schools an opportunity to see lessons in action and question teaching staff who use *Inspire Maths*. This approach builds a strong professional learning community amongst schools using *Inspire Maths*, for them to support each other and share best practice – a key aim of all *Inspire Maths* professional development.

In order to become an Advocate School, the school (or at least two members of the senior leadership team) will have had five days of *Inspire Maths* professional development. The school will have implemented *Inspire Maths* for at least one year and demonstrate engaging, high-quality, exemplary teaching in a learning environment where children are confident learners and are being encouraged to engage in mathematical conversations and reflect on their learning. The Advocate School receives ongoing support through regular contact and professional development, which is tailored to that school and its needs.

Quantitative and qualitative data continues to provide evidence of the exceptional impact of *Inspire Maths*. Independent primary mathematics education consultants work with schools and provide ongoing professional development. This affords a unique insight into what is working well in schools and where further support is needed.

These consultants have identified recurring themes of children developing a strong understanding of number, a deep and lasting procedural and conceptual mathematical understanding and an increase in confidence. In addition to raising attainment, *Inspire Maths* demonstrably increases teachers' enjoyment and confidence in teaching, whilst concurrently increasing children's enthusiasm for mathematics lessons.

Over the next few pages you will read case studies from schools using *Inspire Maths* about the positive impact it has had in the classroom, for both children and teachers.

Wentworth Primary School[5]

School Profile[6]

Head Teacher: Paul Langridge

Town: Dartford

Local Authority: Kent

Children on roll: 535

% of pupils eligible for free school meals at any time during the past 6 years: 13·1%

% of pupils whose first language is not English: 11%

Ofsted: Good, February 2013

Wentworth Primary School was 'average' in the 2017 KS2 SATs in Mathematics at –0·4 and +0·4 in the 2016 KS2 SATs.

Wentworth Primary School's best practice was showcased in the 2017 Parliamentary Review. Paul Langridge took over the position as head teacher in September 2015, aware that a major overhaul had to be undertaken to combat a challenging set of circumstances, and he describes the key changes he has made, one of them in mathematics.

"A review of mathematics in December 2015 identified a number of children who had left Key Stage 1 with gaps in their knowledge and understanding. They had learnt tricks and 'quick fixes' instead of developing sound conceptual understanding. Our planning process was immediately overhauled to ensure that learning was leading the planning rather than vice versa. Following an analysis of several mathematics schemes and visiting pilot schools, I decided to introduce *Inspire Maths* to Years 1 and 2. *Inspire Maths* is very much based on the Singapore Mathematics curriculum and ensures that children develop a strong understanding of number, giving them secure knowledge in order to understand and explain how and why they know. This was further supported by training in September 2016, which was described as 'inspirational' by our staff. Children throughout the school now follow a mathematical process based on the CPA approach. Problem solving has become much more successful, with children now applying the Singapore Bar Method to their reasoning. It is immensely satisfying to watch children experience a 'lightbulb' moment where they smile and recognise that they 'get it!' More importantly, they understand HOW and WHY they 'got it'. *Inspire Maths* will move into Year 3 and then be assimilated through the school.

At Wentworth, learning is based on collective development, where the strengths of individuals are recognised and support is provided to maximise the potential of all."

5 Adapted from 'Primary Education South of England 2017', The Parliamentary Review (Westminster Publications, London): http://www.theparliamentaryreview.co.uk/editions/primary-education/primary-south

6 Department of Education, 'Wentworth Primary School', 2016–2017: https://www.compare-school-performance.service.gov.uk/school/137836?tab=absence-and-pupil-population

Moreland Primary School

School Profile[7]

Head of School: Chris Quinton

Mathematics Leader: Nim Kimyani

Town: London

Local Authority: Islington

Children on roll: 275

% of pupils eligible for free school meals at any time during the past 6 years: 60%

% of pupils whose first language is not English: 68·6%

Ofsted: Good, March 2016

Moreland Primary School was 'well above average' in the 2017 KS2 SATs in Mathematics at +3·5 and at +6·2 in the 2016 KS2 SATs.

Moreland Primary School in Islington, London has been nationally recognised for its excellence by Minister of State, Department of Education, Nick Gibb MP

What impact have the *Inspire Maths* Textbooks and Practice books had on your children's engagement, learning and understanding?

The children love the CPA approach and enjoy how the textbooks and practice books allow them to become more independent learners. They feel much more in control of their learning journey – the books have allowed us to move away from whole-class teaching and towards an emphasis on exploration and guided practice. The children have responded incredibly well to this systemic set-up, and it has truly transformed their engagement with mathematics. They particularly like the fact that they have more time to practise new concepts and have become much more aware of patterns and connections between concepts, and of how their knowledge is building over time.

How supportive do teachers at your school find the *Inspire Maths* teaching materials?

Teachers have found that *Inspire Maths* really supports and scaffolds their subject knowledge, and there is no longer pressure to race through topics. Instead, the emphasis is much more on teaching concepts to mastery and building really firm foundations. Rather than spending time thinking about *what* to teach they can concentrate their time and efforts on *how* to teach. Additionally, time is no longer wasted searching for resources as *Inspire Maths* provides all the materials that teachers need. Teachers are particularly impressed with the quality and depth of the questioning and the level of challenge available for our more able children. They have found that the children have

7 Department of Education, 'Moreland Primary School', 2016–2017: https://www.compare-school-performance.service.gov.uk/school/100415?tab=absence-and-pupil-population

become much more independent, which gives them more time to concentrate on helping those children who might not grasp a concept the first time.

Would you recommend *Inspire Maths* to other schools and, if yes, is there one reason above all others that you would give?

Inspire Maths has transformed the teaching and learning of mathematics in our school to such an extent that it is hard to choose just one reason above all others – but if pushed it would be the engagement that the children have with the subject now. It has made our children much more resilient and independent learners, with a real love and curiosity about mathematics; all supported by a much better understanding of the fundamentals.

The successful work to introduce and rapidly embed *Inspire Maths* has made significant improvements in teaching and progress in mathematics.

Ofsted Report, April 2016

St Paul's C of E Primary School

School Profile[8]

Assistant Head Teacher: Jackie Graham

Town: Sunderland

Local Authority: Sunderland

Children on roll: 234

% of pupils eligible for free school meals at any time during the past 6 years: 17·6%

% of pupils whose first language is not English: 0·6%

Ofsted: Good, October 2013

St Paul's Church of England Primary school was 'well above average' in the 2017 KS2 SATs in Mathematics at +4·8, and at +7·9 in the 2016 KS2 SATs.

What impact/benefit has *Inspire Maths* had on teaching, learning and understanding?

The CPA approach has improved our teachers' understanding of how children learn mathematics and how children can access mathematics as a whole, but in different ways. It has proved invaluable in supporting the middle and low attainers, who have flourished and, in some cases, outshone those who were previously deemed to be more able. I can't wait to see the effects as our '*Inspire Maths* children' progress through the school.

How do you use *Inspire Maths* to meet the expectations of the National Curriculum?

At the moment, we use *Inspire Maths* in Years 1 and 2 and we use the curriculum mapping document to ensure full coverage of the NC objectives. Any which are not included are then taught discretely or in a cross-curricular approach.

On a scale of 1 to 5, how likely would you be to recommend *Inspire Maths* to other schools and what would you say to other schools who are considering purchasing *Inspire Maths*?

5 – highly likely. *Inspire Maths* has given our teachers the confidence and scaffolding to fully embrace a mastery approach and the standards can be seen as soon as I open the books and speak to the children. Our children are adept at explaining their thinking and their reasoning skills are developing rapidly. The implementation and logistics of *Inspire Maths* have not been without their teething problems, but they are minor when compared to the benefits we have gained as a school.

8 Department of Education, 'St Paul's CofE Primary School', 2016–2017: https://www.compare-school-performance.service.gov.uk/school/108836?tab=absence-and-pupil-population

St Joseph's Roman Catholic Primary School

School Profile[9]

Head Teacher: Anne O'Brien

Town: Darwen

Local Authority: Blackburn with Darwen

Children on roll: 144

% of pupils eligible for free school meals at any time during the past 6 years: 20·2%

% of pupils whose first language is not English: 5%

Ofsted: Good, October 2015

St Joseph's Roman Catholic Primary School was 'average' in the 2017 KS2 SATs in Mathematics at -0·8, and at +0·7 in the 2016 KS2 SATs. However, in 2016 children had made significant progress from their KS1 score.

What impact have the *Inspire Maths* Textbooks and Practice Books had on your children's engagement, learning and understanding?

The children love the approach. The learning moves on in small but challenging steps, so that in no time the children have moved from a quite basic level of understanding to something quite challenging. Conceptually, we've never seen anything as complete. The children's deeper understanding is constantly reinforced.

What has been the trend of improvement since using *Inspire Maths*?

What we can see immediately is that the children are gaining a much more secure understanding of the mathematics concepts being taught. We can see some of the weaknesses in our previous (and very well intentioned) methods.

Which activities have been particularly successful with your children, and why?

All of them, really! However, conservation of number in Year 1 has been particularly enhanced as children explore everything there is to know about 12, for example. We are also moving very much towards a growth mind-set approach. This has had a very positive impact on children who were traditionally lower achievers as they are now much more included in whole-class lessons. We love it.

9 Department of Education, 'St Joseph's Roman Catholic Primary School, Darwen', 2016–2017: https://www.compare-school-performance.service.gov.uk/school/119667?tab=absence-and-pupil-population

High achievement in mathematics and the importance of high-quality textbooks

The importance of high-quality textbooks

When we look at recent results from the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) studies, high-performing jurisdictions in the Far East, such as Singapore, consistently top the international league tables for child-performance in mathematics. Mathematics teaching in these countries is characterised by a diligent and systematic approach to the curriculum and teaching, which enables all children to succeed. There are various features of 'teaching for mastery', including the use of high-quality, successful textbooks. These research-based, proven textbooks are carefully structured and highly supportive for both teachers and children.

PISA Results: Maths[1]
2015 (2012)

Rank	Country	Score
1 (2)	Singapore	564 (573)
2 (3)	Hong Kong (China)	548 (561)
3 (6)	Macao (China)	544 (538)
4 (4)	Taiwan	542 (560)
5 (7)	Japan	532 (536)
6 (1– as Shanghai)	Beijing-Shanghai-Jiangsu-Guangdong (China)	531 (613 – as Shanghai)
7 (5)	South Korea	524 (554)
8 (9)	Switzerland	521 (531)
9 (11)	Estonia	520 (521)
10 (13)	Canada	516 (518)
11 (10)	Netherlands	512 (523)
12 (22)	Denmark	511 (500)
13 (12)	Finland	511 (519)
14 (21)	Slovenia	510 (501)
15 (15)	Belgium	507 (515)
16 (16)	Germany	506 (514)
17 (14)	Poland	504 (518)
18 (20)	Republic of Ireland	504 (501)
19 (30)	Norway	502 (489)
20 (18)	Austria	497 (506)
21 (23)	New Zealand	495 (500)
22 (17)	Vietnam	495 (511)
23 (34)	Russia	494 (482)
24 (38)	Sweden	494 (478)
25 (19)	Australia	494 (504)
26 (25)	France	493 (495)
27 (26)	**United Kingdom**	**492 (494)**
28 (24)	Czech Republic	492 (499)
29 (31)	Portugal	492 (487)
30 (32)	Italy	490 (485)

1 Data taken from http://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf

Tim Oates CBE, Group Director of Assessment Research and Development, Cambridge Assessment, was commissioned in 2010 to lead the UK government's review of the 'National curriculum in England: mathematics programmes of study'. The study investigated the use of high-quality textbooks in key nations, how they support teachers and children, and the impact on the teaching and learning of mathematics. His resulting policy paper in 2014 concluded that high-quality textbooks are a vital part of successful implementation of a national curriculum.

He found that:

> *"high-quality textbooks are not antithetical to high-quality pedagogy – they are supportive of sensitive and effective approaches to high attainment, high equity and high enjoyment of learning".*[2]

The National Centre for Excellence in the Teaching of Mathematics (NCETM) guidance on the principles of a well-designed and well-researched mathematics textbook, points out that:

> *"A high-quality mathematics textbook is an educational resource that can be used by pupils both in lessons and independently, and that also provides both subject knowledge and pedagogy support to teachers of mathematics. It is a comprehensive learning tool, providing support for the development of both procedural fluency and conceptual understanding in mathematics: a textbook consisting only of worked examples and simple repetitive exercises is unlikely to develop these. It is essential that the principles under-pinning teaching with variation are reflected in the choice of examples and the structure of the exercises. Pupils must be provided with frequent opportunities for intelligent practice."*[3]

Vanessa Pittard, independent education consultant and former Department for Education (DfE) Assistant Director, goes further, saying that:

> *"For primary teachers, who in the UK and Singapore are not [mathematics] subject specialists, well-designed textbooks do more: they help deepen subject knowledge and develop professional understanding of effective teaching methods. High-quality mathematics textbook series found in Singapore and other leading jurisdictions include pupil textbooks, teacher guides and practice books. Teacher guides serve as essential manuals for teachers: they distil key concepts, clarify objectives and set out logical teaching sequences drawing on the content of the vital pupil textbook."*[4]

In Singapore, currently the leading jurisdiction internationally for mathematics child-performance, the high quality of textbooks is upheld through a rigorous textbook review process. These textbooks are research based and the content is continually tested, reviewed and refined through classroom practice. The rigorous review process by a panel of professionals including educators and academics from the universities culminates in the materials being approved by the Ministry of Education. This means that *My Pals are Here!* (Marshall Cavendish), Singapore's leading mathematics textbook programme, has been continually refined for over seventeen years.

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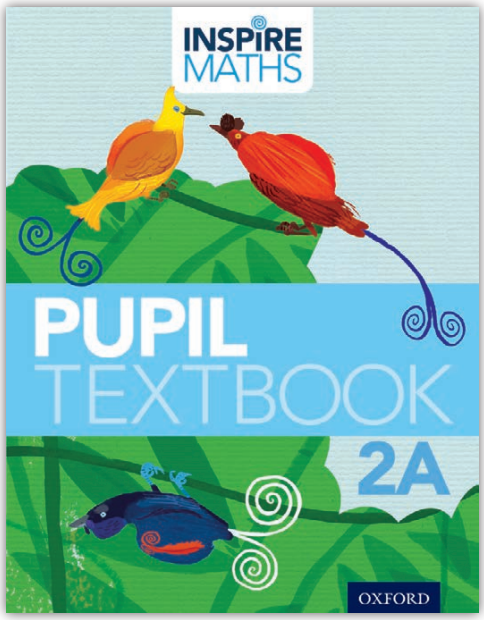
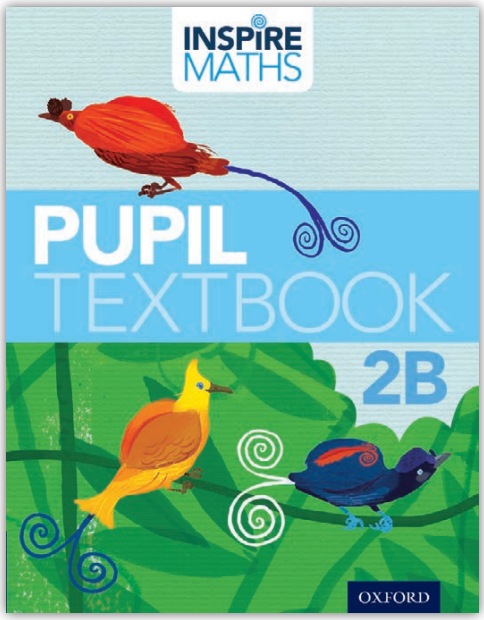
2 Oates, T (2014) Why Textbooks Count, Cambridge Assessment. http://www.cambridgeassessment.org.uk/news/new-research-shows-why-textbooks-count-tim-oates/
3 https://www.ncetm.org.uk/files/21383193/NCETM+Textbook+Guidance.pdf
4 https://educationblog.oup.com/primary/mastery-myths-textbooks-constrain-creative-teaching

Inspire Maths textbooks





Inspire Maths is the UK edition of *My Pals Are Here!*. It provides a logical, detailed curriculum progression and lesson content, with rigorous supporting materials for non-specialist primary school teachers of mathematics. This enables consistency both within schools and between schools, and for every teacher to teach to a consistently high standard and to meet the exacting requirements of the National Curriculum.

The development of the curriculum within *Inspire Maths* focuses on slow, secure building of mathematical knowledge, with whole-class interactive teaching, high expectations for all, plenty of guided and independent practice and a focus on deep conceptual understanding.

The concrete–pictorial–abstract (CPA) approach is inherent throughout the textbooks with teaching for both understanding and fluency. New concepts are introduced concretely with rigorous support for children to move towards abstract and procedural mathematics with understanding. There is a consistent use of models and images to support the development of new concepts, which means a secure, long-term, and deep conceptual understanding of mathematics.

Inspire Maths provides detailed support for teachers on lesson sequence, what to look and listen for, subject knowledge, lesson planning, suggested higher-order questions to support and challenge reasoning, and questions to support assessment. Drawing on variation theory, which emphasises the importance of children experiencing the same mathematical concept in carefully varied ways, *Inspire Maths* builds on understanding, in carefully designed steps, in order for children to develop deep, conceptual understanding as they progress towards mastery. The textbooks are equally supportive for teachers and children.

Inspire Maths has had a huge impact on our whole-school approach to mathematics. We feel that we are now addressing the three main National Curriculum aims through a more structured and connected programme. Through the professional development that we have received and the detailed Teacher Guides, our teachers have developed a deeper understanding of how children become successful mathematicians. By implementing *Inspire Maths* across our school it has brought a new found vibrancy towards the teaching and learning of mathematics.

St Thomas CE Primary School, Blackburn

Inspire Maths Professional Development

Teachers are also supported through *Inspire Maths* Continuing Professional Development to develop a pedagogical understanding of the Singapore approach to teaching and learning mathematics, to understand how to use the textbooks and to build capacity to successfully implement *Inspire Maths*, ensuring sustained learning and achievement.

In March 2017, the report of the Independent Teacher Workload Review Group found that:

> *"Teachers spend an undue amount of time planning and resourcing lessons, and there are clear measures that should be taken by Government, Ofsted, schools, and teachers to lessen this burden."*[5]

Inspire Maths professional development consultants visit schools and work with teachers who are teaching for mastery. Teachers using *Inspire Maths* say that they have been able to change the way they plan, so that they don't have to spend time deciding *what* to teach and can invest more of their time in designing their lessons and considering *how* they teach. They find the *Inspire Maths* Teachers Guides highly supportive because they detail what needs to be taught and how, ensuring excellent progression within the subject.

Three Legged Cross First and Nursery School, Dorset, who teach mathematics with *Inspire Maths*, say that their results improved because of:

> Teacher confidence, greater continuity of teaching and improved consistency, deeper knowledge of concepts taught for children, clearer progression.

As a teacher, you know that the textbooks do not do the teaching. You are responsible for the teaching and learning and it's important that you understand the approach taken within the textbooks. *Inspire Maths* is highly supportive for both specialist and non-specialist mathematics teachers, providing detailed guidance on what to teach and how to teach through a progression in small steps, which is fundamental to teaching for mastery.

> *"… having access to an elegant, coherent and comprehensive resource makes it easier. Teachers are liberated to focus on designing and delivering the engaging, interactive lessons which are characteristic of mastery teaching.*
>
> *Not only this, children have a resource to return to and consult, and teachers have access to a well-designed set of ready-made exercises for practice and assessment, lightening the load further and reinforcing what's taught."*[6]
>
> *Vanessa Pittard*

5 Eliminating unnecessary workload around planning and teaching resources: https://www.atl.org.uk/policy-and-campaigns/policy-posts/tackling-workload-together
6 https://educationblog.oup.com/primary/mastery-myths-textbooks-constrain-creative-teaching

Children learning mathematics with *Inspire Maths* often say how much they love it. One of the things they say they like is that if they forget what to do or how to do it, they can use the textbooks to remind themselves what has gone before and what they are working towards.

The research underpinning the mathematical content and its organisation minimises the risk of children getting confused, misunderstanding concepts or experiencing cognitive overload. In addition, the organisation of the topics in *Inspire Maths* helps children see connections across the subject, which is helpful in deepening their conceptual understanding.

The benefits of using high-quality textbooks

High-quality textbooks such as *Inspire Maths* have a profound impact on the teaching and learning of mathematics. They set out a well-proven, detailed and connected curriculum, which provides schools with cohesion across academic years and support in school curriculum planning. They provide teachers with a highly supportive teaching guide, and can scaffold your understanding of effective maths pedagogy, thus ensuring that lessons are consistently of a high standard. Teachers can be further supported through professional development for the textbook programme and raising standards in the teaching and learning of mathematics. Using a high-quality textbook reduces the time teachers spend finding resources and planning their lessons, so that teachers can dedicate their time to designing lessons. Finally, the textbook programme provides coherent resources for pedagogy, conceptual understanding, practice, assessment and further challenge, so it should be used comprehensively for maximum benefit for teachers and children. High-quality textbooks support effective teaching, enhance teacher subject knowledge, build children's confidence and deepen their conceptual understanding, enabling them to become confident mathematicians, embarking on a lifelong love of mathematics.

As you read through this Getting Started Guide, you will understand the benefits of using *Inspire Maths*, with practical examples of how the programme supports the teaching and learning in your classroom.

Pace, progression and fidelity

Inspire Maths – the UK edition of the authentic Singapore programme

Inspire Maths is the UK edition of the highly-regarded Singapore textbook programme *My Pals are Here!*, which has been used in Singaporean schools since 2001. Therefore, *Inspire Maths* follows the Singapore mathematics curriculum which builds knowledge systematically in small cumulative steps. In adapting *Inspire Maths* for the UK, the only content changes made were to contexts and references such as currency and place names to make them more familiar to our children. The essential content of *My Pals are Here!* was purposely left intact, since it had been regularly reviewed, tested extensively in practice, revised and approved by the Ministry of Education in Singapore. The *My Pals are Here!* programme was written to support non-specialist maths teachers and primary maths teachers in raising the attainment of average children. The content, spiral approach and progression, based on extensive research, such as the Cockcroft Report (published in 1982)[1], enabled Singaporean children to climb to the top of international independent studies of maths attainment, such as PISA (Programme for International Student Assessment), and TIMSS (Trends in International Mathematics and Science Study) since 1995, where they have remained since. The carefully designed curriculum is one of the factors which contribute to Singapore's success.

The Singapore curriculum is specially designed to ensure that all children succeed in learning maths by developing a deep understanding of the concepts. It is characterised by purposeful organisation of topics, and covering concepts for deep understanding.

Purposeful organisation of topics in *Inspire Maths*

The sequencing of the topics in *Inspire Maths* takes into consideration children's cognitive development to facilitate the maximum mastery of key concepts. For example, measurement and arithmetic topics reflect Piaget's work on cognitive development, specifically in the concrete operational stage. Piaget's ideas inform the sequencing of concrete activities and *Inspire Maths* adopts Bruner's concrete–pictorial–abstract (CPA) approach when concepts are introduced. This approach supports the transition from manipulation of concrete objects to mental representations, the development of mathematical language and the internalisation of strategies required to operate mathematically. See **How to teach with *Inspire Maths*** on pages 38–57 for further details on the CPA approach.

Geometry topics are organised according to the Van Hiele levels of geometry understanding. Pierre Van Hiele and Dina Van Hiele-Geldof[2] developed a theoretical model involving five levels of thought development in geometry. This model involves a systematic approach to children's development of geometrical ideas. To be on a particular level a child has to consistently exhibit behaviours indicative of that level. The levels give

1 Cockcroft, W. H., The Cockcroft Report: Mathematics Counts (Her Majesty's Stationery Office, London, 1982): http://www.educationengland.org.uk/documents/cockcroft/cockcroft1982.html [accessed 8 January 2018]

2 van Hiele, P. M., A child's thought and geometry. In D. Fuys, D. Geddes, & R. Tischler (Eds.), *English translation of selected writings of Dina van Hiele-Geldof and P. M. van Hiele* (Brooklyn: Brooklyn College, 1984) [Original document in French: La pensee de l'enfant et la geometrie, Bulletin de l'Association des Professeurs de Mathematiques de l'Enseignment Public. 1959]

a clear picture of the processes and stages children go through to reach a secure and abstract level of geometric understanding, from level 1 (recognising and visualising shapes) to level 5 (formal geometrical reasoning).

The world-class research underpinning the sequencing of the programme minimises the risk of any cognitive overload. Furthermore, the organisation of the topics in *Inspire Maths* helps children to make connections across topics, which is helpful in deepening their conceptual understanding.

Hiebert and Lefevre (1986)[3] talk about the importance of these connections,

> *"Conceptual knowledge is characterised most clearly as knowledge that is rich in relationships. It can be thought of as a connected web of knowledge, a network in which the linking relationships are as important as the discrete pieces of information. Relationships pervade the individual facts and propositions so that all pieces of information are linked to some network."*

This connected web of knowledge is integral to *Inspire Maths*. An example of this is the way children learn how to tell the time in *Inspire Maths*. In *Inspire Maths* 1, they learn to tell the time to the hour and half hour and compare and sequence intervals of time. In *Inspire Maths* 2, children start by telling and writing the time to five minutes, including quarter past and quarter to the hour and drawing hands on an analogue clock to show times given. Children use their knowledge and understanding of multiplying by five to make a connection between the five times table and telling the time. Doing so deepens children's conceptual understanding, which is an essential part of maths mastery.

The organisation of topics in *Inspire Maths* also provides opportunities for the application and extension of fundamental concepts, once children have learnt them, to help deepen their understanding and mastery. For example, in *Inspire Maths* 1, children become secure in comparing and ordering numbers up to 100 and the place value of digits in a 2-digit number. In *Inspire Maths* 2, children build on their knowledge of the place value of tens and ones to learn about the place value of hundreds in 3-digit numbers. They then apply their knowledge to compare and order 3-digit numbers up to 1000. Children's understanding of place value is developed throughout *Inspire Maths,* culminating in *Inspire Maths* 5 when children will be working with numbers up to 10 million, rounding to the nearest hundred and nearest thousand, multiplying and dividing by 10, 100 and 1000, and eventually working with decimals up to three decimal places.

In *Inspire Maths* 1 and 2, children learn addition, subtraction, multiplication and division. Children then apply their understanding of numbers and the four operations to practical problems, which is a Key Stage 2 topic but is introduced earlier to align with Skemp's theory on relational learning.[4] Children should not learn skills and concepts in isolation; instead, they should see the relationships among these concepts to bridge any cognitive gap and make learning more meaningful. It is therefore important that children are given ample opportunities to apply their skills operationally, and put their knowledge into practice, thereby enabling them to master the concepts and skills in operations.

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3 Hiebert, J., and Lefevre, P. Conceptual and procedural knowledge in mathematics: An introductory analysis. In J. Hiebert (ed.), *Conceptual and Procedural Knowledge: The Case of Mathematics.* (Hillsdale, NJ: Lawrence Erlbaum Associates, 1986), pp.3–4.

4 Skemp, Richard R. Relational Understanding and Instrumental Understanding (Warwick: Department of Education, University of Warwick, 1976): https://www.atm.org.uk/write/MediaUploads/Resources/Richard_Skemp.pdf

In-depth development of individual concepts in *Inspire Maths*

In *Inspire Maths*, concepts in each topic are carefully developed using Piaget's Assimilation and Accommodation Approach[5]. This ensures that sufficient time is given for children to master each concept before they move on to the next.

Piagetian conceptual development takes place over four stages:

- **Learn**: Direct teaching to develop knowledge and deep understanding.
- **Guided practice**: Informal assessment of children's understanding.
- **Activity**: Help for children to accommodate the concepts and skills learnt.
- **Practice**: Further enhancement to the accommodation of concepts and skills.

The structure of the *Inspire Maths* programme mirrors these stages through the teaching sequence 'Let's Learn', 'Guided Practice', 'Activity' and 'Independent Practice'. With this structure, children have ample opportunities to practise concepts in *Inspire Maths*, and the scaffolded approach of practice gradually releases the responsibility of learning to the children.

During 'Guided Practice', children practise concepts with teacher's guidance and you have the opportunity to identify those who need immediate intervention, consolidation, further practice or challenge to go deeper. This contributes to making learning accessible to all, and by the time children reach the second stage of practice, which is done independently, they will be able to answer the questions confidently. This cycle of conceptual development repeats each time a new concept is introduced so mastery is achieved in a structured and coherent manner, without the risk of any child falling behind.

A spiral, cumulative approach

The spiral, cumulative approach relies on building mathematical content progressively over time, so it is strongly recommended you teach the content in *Inspire Maths* in the order it is presented. There are some 'National curriculum in England: mathematics programmes of study' objectives not covered by the Pupil Textbooks. You will find 'Additional Activities' on *Inspire Maths Online* (www.oxfordowl.co.uk) to support you to meet these (see **How *Inspire Maths* relates to the National Curriculum** for further guidance).There are also some topics introduced earlier in *Inspire Maths* than in the National Curriculum. You can be confident that all relevant objectives will be covered by the end of each Key Stage when you use the Pupil Textbooks and the additional activities on *Inspire Maths Online*.

As *Inspire Maths* follows the Singapore maths curriculum progression, it is structured by stage rather than by age so it is not necessary to cover all the content in, for example, *Inspire Maths* 2 in Year 2. Children can continue working on *Inspire Maths* 2 in Year 3. At the start of each academic year, the appropriate starting point should be considered after liaising with the previous class teacher and the needs of the class. Please refer to the chart on pages 6–7 for a guide to teaching and using the *Inspire Maths* Pupil Textbooks across the academic years.

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5 Hall J., Lindorff A. and Sammons P., *Evaluation of the Impact and Implementation of Inspire Maths in Year I Classrooms in England: Findings from a Mixed-Method Randomised Control Trial* (Department of Education, University of Oxford, Oxford 2016): https://ore.exeter.ac.uk/repository/handle/10871/24265

The importance of appropriate pace

The medium-term plans in the Teacher's Guides give you an indication of how many weeks you might spend covering a particular section in a unit, together with the learning objectives, an outline of the thinking skills and textbook resources you will need when teaching the section. However it is important to remember that this is only guidance; for example, you do not need to cover all of *Inspire Maths* I in Year I. Some teachers ask about the amount of time they should spend on a particular topic. The weeks allocated in the long-term planning are only a guide. Depending on how quickly a particular cohort gains a secure grasp of the content, you may spend more or less time on particular units from one year to the next. The important thing is not to rush children through the content. You may find it helpful to annotate your Teacher's Guide, making a careful note of how long it took your children to demonstrate a deep conceptual understanding.

If you find that your children are still working through, for example, *Inspire Maths* Pupil Textbook IB at the end of Year I, don't worry that you are going too slowly. Slower pace at early stages means that all children are likely to be cognitively ready as well as mathematically prepared, and therefore will be both less likely to fall behind and far more likely to progress well at later stages. The National Curriculum introduction specifies:

> *"Schools are … only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage, if appropriate."*[6]

The most important thing is not to move on too quickly, because this leads to gaps in knowledge and misconceptions which, if ignored, will manifest themselves at Key Stage 4 when children take GCSEs. Going slowly ensures children have depth of understanding, rather than superficial understanding which is often unreliable. Take your time progressing through the material and allow children the time they need to develop their deep conceptual understanding.

Inspire Maths supports the National Curriculum expectation that "the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage."[7] Whilst the *Inspire Maths* medium-term plans give a suggestion of the time needed to develop a concept, it is important that you apply your professional judgement when considering whether the required understanding is in place before progressing to the next unit of work.

Fidelity to the National Curriculum

There is plenty of support and guidance on *Inspire Maths Online* to help you ensure that you have met the requirements of the National Curriculum for the relevant Key Stage, for example, there are detailed correlation charts to help you understand where key National Curriculum concepts are taught and practised in *Inspire Maths*.

6 Department for Education (2013), The national curriculum in England: Key stages I and 2 framework document, page 100: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf

7 Department for Education (2013), The national curriculum in England: Key stages I and 2 framework document, page 99: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf

If you are teaching Year 2 or Year 6, you will find useful charts on page 72 of the *Inspire Maths* Getting Started Guides 2 and 6 that detail the necessary content to cover for the relevant Key Stages. There are also flow charts in the 'SATs Guidance Documentation' on *Inspire Maths Online*, which suggest routes through the content to ensure that children have covered everything required for their SATs. For example, when teaching *Inspire Maths* 2, as an exception, you may need to visit the units in a different order to cover Unit 11 on money by the time it comes to the SATs. Refer to the guidance documents for further support. In both *Inspire Maths* 2 and *Inspire Maths* 6, you will find that there is some content that goes beyond National Curriculum expectations. Your focus should be on Key Stage 1 content and its consolidation for Year 2, and Key Stage 2 content and its consolidation for Year 6. If you are confident that the necessary Key Stage material has been consolidated and children are secure with deep conceptual understanding, then this material could be introduced to your children, or introduced after Key Stage 1 and Key Stage 2 National Curriculum tests in preparation for transition.

Some schools using *Inspire Maths* have reported that classes who spend plenty of time investigating and working with, for example, number, might appear to be progressing through the topics quite slowly, particularly in Year 1 when children are laying down really firm foundations. However, as a result, they can then move more quickly through later content in Key Stage 2 as their deep conceptual understanding forms a strong and reliable foundation for later progress.

Some schools may be using and implementing *Inspire Maths* in this way:

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
*IM*1	*IM*2	*IM*3	*IM*4	*IM*5	*IM*6

Some schools may be using and implementing *Inspire Maths* like this:

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
*IM*1	*IM*2	*IM*3	*IM*4	*IM*5	*IM*6

You will need to decide what works for you and your children but you may well use *Inspire Maths* the second way, particularly whilst you are becoming familiar with the content. It is important to remember that schools are only required to teach the relevant programme of study by the end of that Key Stage.

Inspire Maths is a proven, high-quality maths programme based on years of research and refinement and provides a secure foundation for children to become confident learners, proficient problem solvers and capable mathematicians. Our children will have an appreciation for and an enjoyment of mathematics. What better foundations and life skills can we give them?

Over the next few pages, you will find examples of how a concept is gradually and systematically developed in *Inspire Maths*. These examples show the careful progression with exemplification across all the interconnected components and give an indication of the path within each level and across *Inspire Maths*.

Pace and progression in *Inspire Maths* 2: Place value

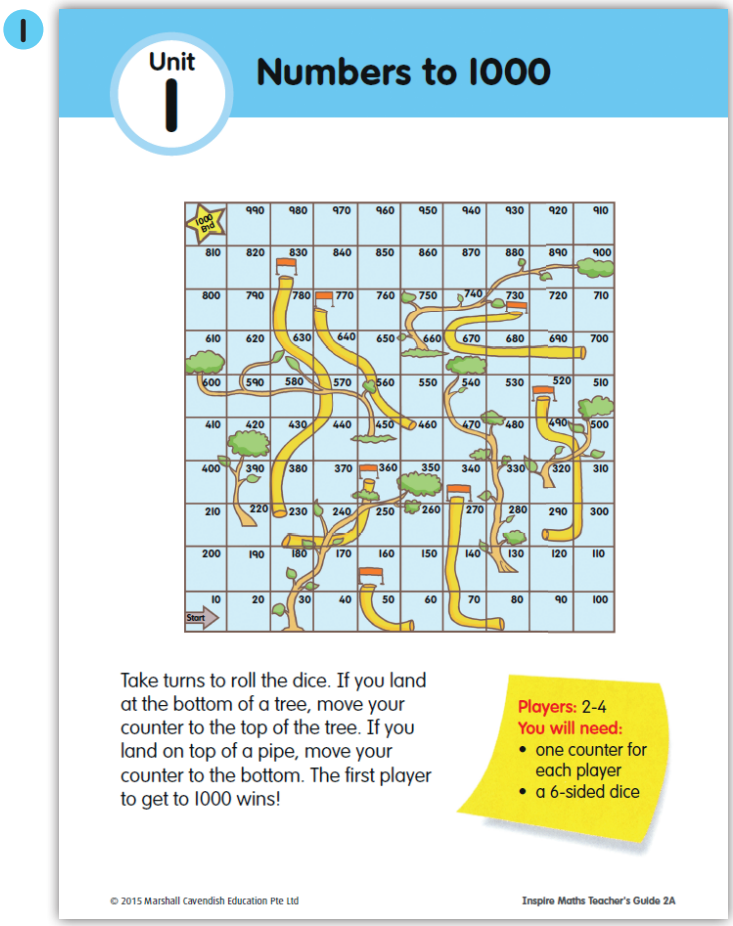
Previous learning

Units throughout *Inspire Maths* I ensure a solid foundation for understanding place value of numbers, starting with numbers up to 10, then up to 20, then up to 40, then up to 100. This was achieved by children comparing, counting and arranging numbers in ascending and descending order; developing their use of vocabulary to describe patterns and relationships; reading and writing numbers in numerals and words; and partitioning and recombining numbers up to 100.

New learning

In *Inspire Maths* 2, the structure of the lessons, activities and games is similar to those in *Inspire Maths* I, where the focus of new learning is on the developing number patterns. At the start of Unit I, place value is recapped by:

- Counting up to 10 in ones to make one group of 10, then counting in tens to 100 to make one group of 100, then counting on from 100 in ones and tens, up to 1000. The patterns and relationships identified in *Inspire Maths* I are continued and applied to numbers up to 1000.
- The Unit Starter introduces the topic with a familiar board game, counting up to 1000 and moving in groups of 10.

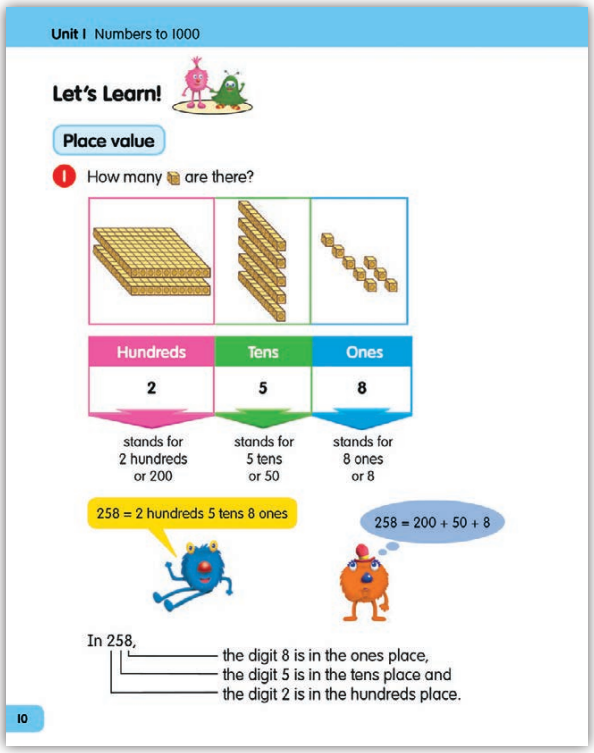


***Inspire Maths Online: Inspire Maths* 2 Unit Starter Illustrations, Unit I**

A place-value chart is now introduced in the Pupil Textbook as a perceptual variation, representing numbers up to 1000, with a hundreds column added to the tens and ones chart that was used in *Inspire Maths* 1. There is very clear progression in the teaching and children's learning, focusing on the pattern in number, sequencing, making connections and identifying relationships:

- Consistent use of models and images, using a variety of concrete materials on a place-value chart 1
- Counting on and back from a given number
- Recording use of concrete materials by drawing the representations
- Recording use of concrete materials by writing the digits
- Interpreting pictures of amounts by writing the digits on a place-value chart
- Interpreting the digits on a place-value chart by drawing the concrete materials
- Reading and writing numbers up to 1000 in numerals and words
- Partitioning numbers up to 1000
- Comparing numbers
- Arranging numbers in ascending and descending order
- Games and practice to consolidate this learning and embed skills and understanding.

1

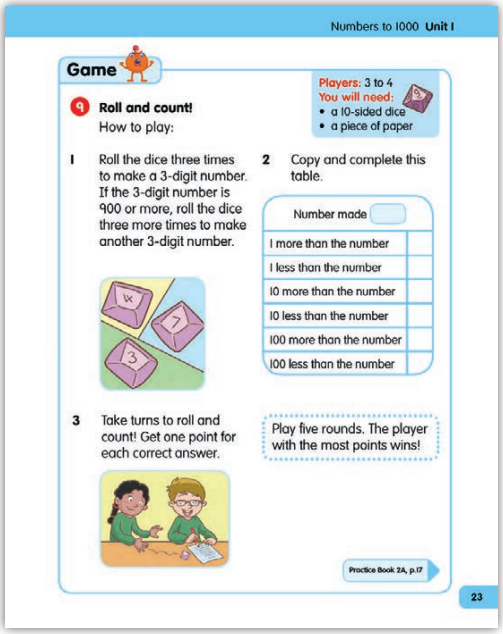


***Inspire Maths* Pupil Textbook 2A, page 10**

Moving between the concrete, pictorial and abstract representations of numbers up to 1000 identifies 'what is the same, what is different?' about them, drawing children's focus to the essential aspects of place value. This careful scaffolding of learning helps develop a deep understanding of place value. The teaching sequence continues:

- Comparing amounts, which is greater and which is smaller, arranging numbers in ascending and descending order, identifying patterns
- Counting 1 more or less, 10 more or less, 100 more or less
- Games, activities and practice to consolidate this learning and embed skills and understanding 1
- Opportunities to investigate place value and deepen understanding. 2

1



Numbers to 1000 Unit 1

Game

Roll and count!

How to play:

Players: 3 to 4
You will need:
- a 10-sided dice
- a piece of paper

1 Roll the dice three times to make a 3-digit number. If the 3-digit number is 900 or more, roll the dice three more times to make another 3-digit number.

2 Copy and complete this table.

Number made	
1 more than the number	
1 less than the number	
10 more than the number	
10 less than the number	
100 more than the number	
100 less than the number	

3 Take turns to roll and count! Get one point for each correct answer.

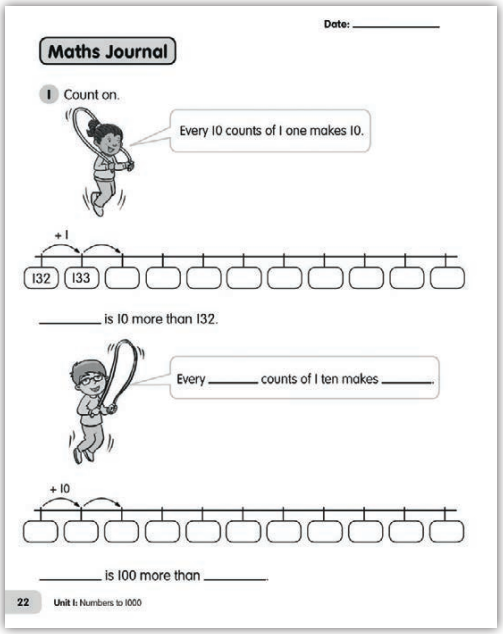
Play five rounds. The player with the most points wins!

Practice Book 2A, p.17

23

Inspire Maths **Pupil Textbook 2A, page 23**

2



Date: _____

Maths Journal

1 Count on.

Every 10 counts of 1 one makes 10.

+1

132 133

_____ is 10 more than 132.

Every _____ counts of 1 ten makes _____.

+10

_____ is 100 more than _____

22 Unit 1: Numbers to 1000

Inspire Maths **Practice Book 2A, page 22**

The medium-term planning suggests that you spend a minimum of two weeks teaching Unit 1. We advise that if your class take longer to understand the concepts, you do not rush through this unit, as this concept underpins the number work that follows, in particular Unit 2: Addition and Subtraction within 1000.

You will see from the National Curriculum chart on page 72 that some content goes beyond Key Stage 1 and into Key Stage 2 requirements, for example reading and writing numbers up to 1000 in numerals and in words and recognising the place value of each digit in a 3-digit number (hundreds, tens and ones). Check children are secure, developmentally ready, have deep conceptual understanding of the foundations and are supported by the use of consistent models and images, and then use your professional judgement to assess if they are ready for these next steps. You may want to use some of this content after the SATs tests in preparation for transition into Key Stage 2.

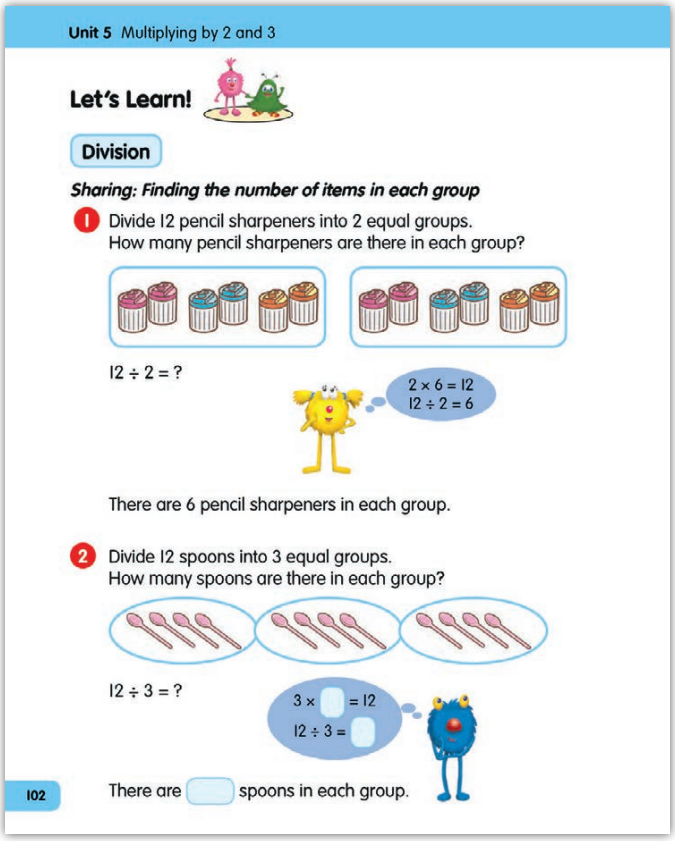
Pace and progression in *Inspire Maths* 2: Fractions

Fractions are introduced in Unit I2 of *Inspire Maths* 2B, and build a strong visual image of equal parts and understanding of fractions of shapes. The medium-term planning suggests that you spend a minimum of three weeks teaching this unit.

Previous learning

Previous learning of division in Unit 5 was sharing (finding the number of items in each group) and grouping (making equal groups) structures. In Units 5 and 7, division was taught as the distribution of a set of items into equal groups by relating multiplication facts. Area models were used to represent division as the inverse of multiplication. I

I



Unit 5 Multiplying by 2 and 3

Let's Learn!

Division

Sharing: Finding the number of items in each group

1 Divide 12 pencil sharpeners into 2 equal groups.
How many pencil sharpeners are there in each group?

12 ÷ 2 = ?

2 × 6 = 12
12 ÷ 2 = 6

There are 6 pencil sharpeners in each group.

2 Divide 12 spoons into 3 equal groups.
How many spoons are there in each group?

12 ÷ 3 = ?

3 × ☐ = 12
12 ÷ 3 = ☐

There are ☐ spoons in each group.

102

***Inspire Maths* Pupil Textbook 2A, page 102**

Before starting Unit I2, the Unit Starter on *Inspire Maths Online* gives practical examples of using fractions to divide cakes, sandwiches and pizzas, emphasising **equal** parts to be shared, referring to an area model. The word 'divide' is used frequently, connecting the concept of fractions to division.

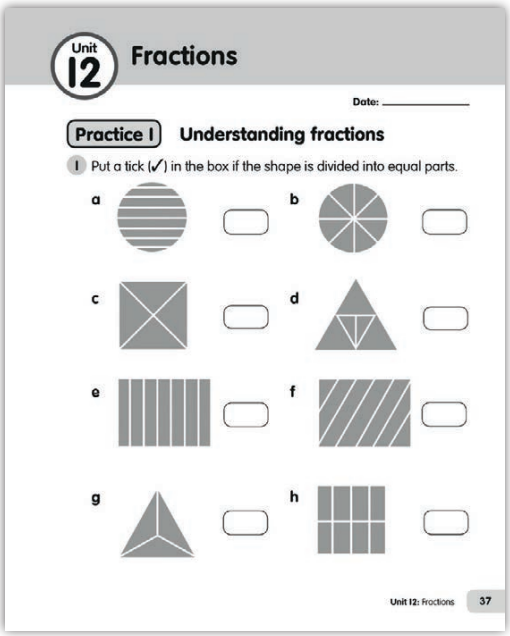
New learning

Unit I2 follows a logical step-by-step approach, moving back and forth between procedural and conceptual representations of fractions, steadily building understanding that fractions make up equal parts of a whole, learning how to name and write these equal parts, how to order and compare fractions, and how to add and subtract 'like' fractions.

The first sequence of lessons introduces the concept of fractions and provides a vocabulary to use when working with them:

- Understanding 'equal' and 'unequal' parts by folding paper shapes and identifying the number of equal parts (linking to a 'part-whole' concept)
- Emphasising the number of 'equal parts' and naming it as the denominator in a written fraction
- Saying and writing fractions
- Identifying the number of equal parts in a divided shape, and folding a shape into a specified number of equal parts. Note that a variety of shapes and sizes are used to represent fractions so that children are exposed to different aspects of this concept. 1
- Shading fractions and naming the shaded and unshaded fractions
- Reading fractions
- Drawing shapes divided into equal parts and labelling fractions
- Games, activities and practice to consolidate this learning and embed skills and understanding. 2

1


Unit I2 Fractions

Date: _____

Practice 1 Understanding fractions

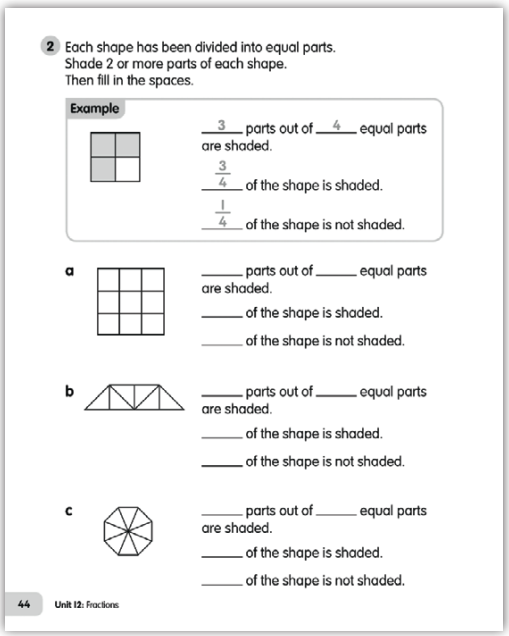
1 Put a tick (✓) in the box if the shape is divided into equal parts.

a b c d e f g h

Unit I2: Fractions 37

Inspire Maths Practice Book 2C, page 37

2


2 Each shape has been divided into equal parts.
Shade 2 or more parts of each shape.
Then fill in the spaces.

Example

3 parts out of 4 equal parts are shaded.

3/4 of the shape is shaded.

1/4 of the shape is not shaded.

a

_____ parts out of _____ equal parts are shaded.

_____ of the shape is shaded.

_____ of the shape is not shaded.

b

_____ parts out of _____ equal parts are shaded.

_____ of the shape is shaded.

_____ of the shape is not shaded.

c

_____ parts out of _____ equal parts are shaded.

_____ of the shape is shaded.

_____ of the shape is not shaded.

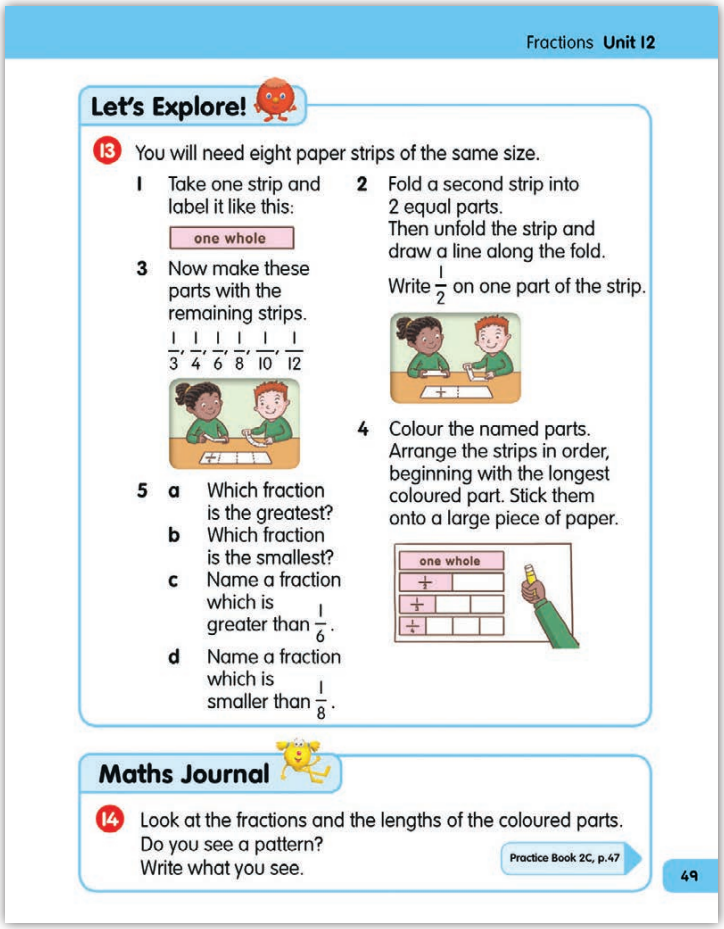
44 Unit I2: Fractions

Inspire Maths Practice Book 2C, page 44

The next stage is comparing and ordering fractions:

- Learning that the term 'whole' doesn't refer to a fixed amount, and the 'whole' must be the same to compare and order fractions
- Drawing models divided into fractions and identifying 'most', 'least', 'greatest', 'smallest'
- Teaching strategies to compare and order fractions with the same denominator
- Teaching strategies to compare and order fractions with different denominators
- Games, activities and practice to consolidate this learning and embed skills and understanding. I

I



Fractions **Unit 12**

Let's Explore!

13 You will need eight paper strips of the same size.

1 Take one strip and label it like this:

one whole

2 Fold a second strip into 2 equal parts. Then unfold the strip and draw a line along the fold. Write $\frac{1}{2}$ on one part of the strip.

3 Now make these parts with the remaining strips.

$\frac{1}{3}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, \frac{1}{12}$

4 Colour the named parts. Arrange the strips in order, beginning with the longest coloured part. Stick them onto a large piece of paper.

5 a Which fraction is the greatest?
b Which fraction is the smallest?
c Name a fraction which is greater than $\frac{1}{6}$.
d Name a fraction which is smaller than $\frac{1}{8}$.

Maths Journal

14 Look at the fractions and the lengths of the coloured parts. Do you see a pattern? Write what you see.

Practice Book 2C, p.47

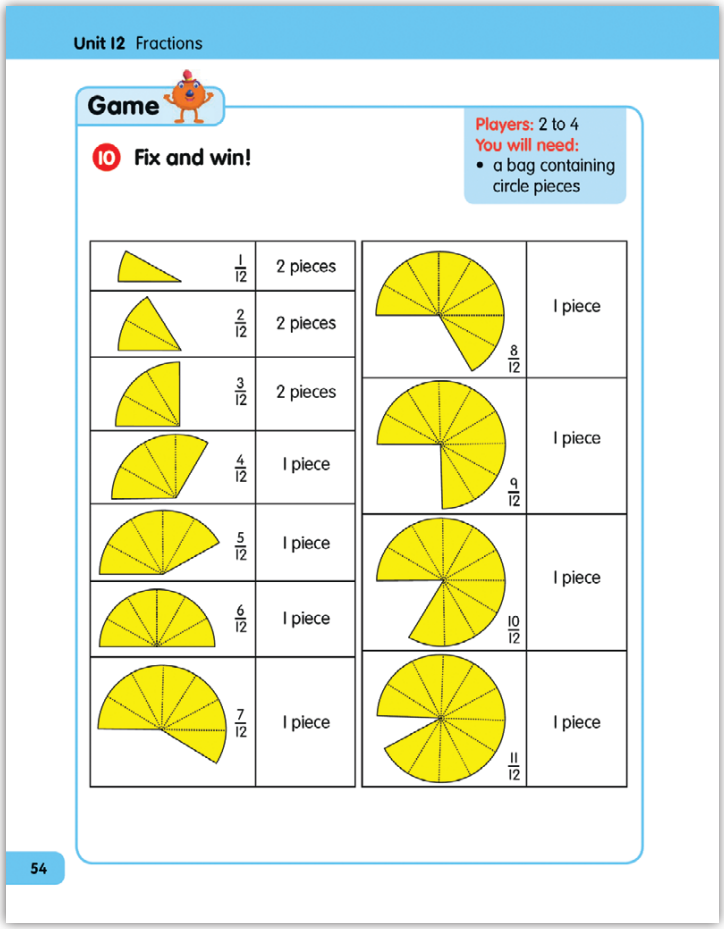
49

***Inspire Maths* Pupil Textbook 2B, page 49**

The next learning objective is adding and subtracting 'like' fractions:

- Adding two or three fractions with the same denominator, taken from a whole
- Subtracting a fraction from a fraction with the same denominator, taken from a whole
- Subtracting two fractions with the same denominator from the same whole
- Conceptualising adding and subtracting of fractions by representing with model drawings
- Games, activities and practice to consolidate this learning and embed skills and understanding. I

I



Unit 12 Fractions

Game

10 Fix and win!

Players: 2 to 4
You will need:
- a bag containing circle pieces

$\frac{1}{12}$	2 pieces	$\frac{8}{12}$	I piece
$\frac{2}{12}$	2 pieces	$\frac{9}{12}$	I piece
$\frac{3}{12}$	2 pieces	$\frac{10}{12}$	I piece
$\frac{4}{12}$	I piece	$\frac{11}{12}$	I piece
$\frac{5}{12}$	I piece		
$\frac{6}{12}$	I piece		
$\frac{7}{12}$	I piece		

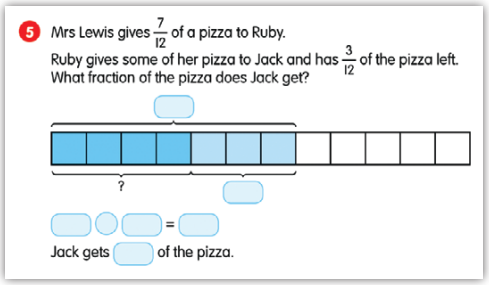
54

***Inspire Maths* Pupil Textbook 2B, page 54**

Finally:

- Recalling and applying 'part-whole' and 'adding on' concepts in adding two fractions using the bar model drawing to solve word problems
- Recalling and applying 'part-whole' and 'taking away' concepts in subtracting fractions using the bar model drawing to solve word problems 1
- Investigation and practice to consolidate this learning and embed skills and understanding. 2

1



***Inspire Maths* Pupil Textbook 2B, page 58**

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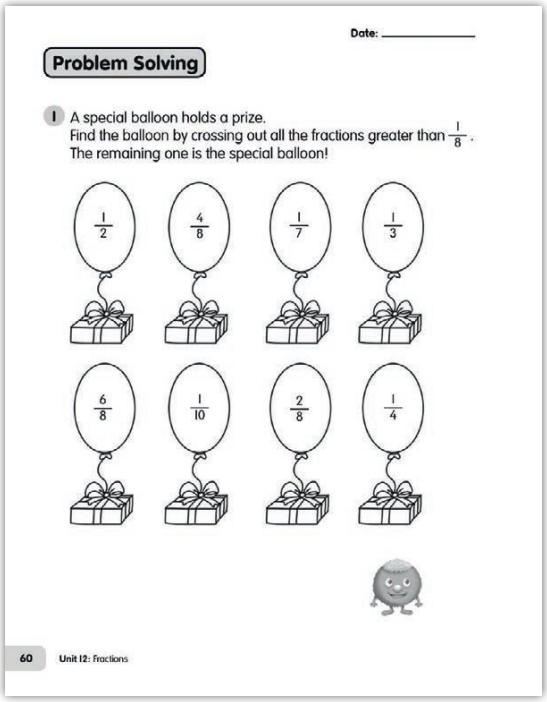


***Inspire Maths* Practice Book 2C, page 60**

Only proper fractions (where the numerator is less than the denominator) are included in Unit 12. Fractions are taught next in *Inspire Maths* 3B Unit 14, when the meaning of the vocabulary of 'numerator' and 'denominator' will be recapped; and children will start to understand equivalent fractions and a fraction in its simplest form.

You will see from the National Curriculum chart on p72 that some content goes beyond Key Stage 1 and into Key Stage 2 requirements, for example comparing and ordering unit fractions and adding and subtracting fractions with the same denominator within one whole. Check if children are secure, developmentally ready, have deep conceptual understanding of the foundations and are supported by the use of consistent models and images, and then use your professional judgement to assess if they are ready for these next steps. You may want to use some of this content after the SATs tests in preparation for transition into Key Stage 2.

Achieving depth through careful pace and progression

This tried-and-tested authentic maths programme from Singapore facilitates mastery through its organisation of topics and its rigorous structure, based on best practice principles and methods of teaching and learning mathematics. To help your children to achieve deep conceptual understanding, the programme should be followed in the order it is presented. Adopting a 'pick and mix' approach to using the *Inspire Maths* programme is not recommended. However, there is often an overlap between Key Stage 2 and Key Stage 3 requirements, and professional judgement should be used as to whether, and when, Key Stage 2 or 3 material should be taught. As well as having a secure conceptual underpinning for successful progress through the curriculum, children also need to be developmentally ready. This is particularly crucial in relation to successful transition from concrete operational thinking (mathematical knowledge and operations linked directly to concrete concepts and examples) to more formal and abstract mathematics. When children have secure foundations, deep understanding and guided support, they can approach some of these questions with great success.

Since *Inspire Maths* is the Singapore Maths programme in its entirety, the potential of *Inspire Maths* to help children in the UK achieve mastery is immense. After many years of success in helping Singaporean children master maths, we are confident that the purposeful organisation of topics and robust approach for developing individual concepts in *Inspire Maths* will enable children in the UK to achieve similar results. High attainment and high equity are achievable when teaching is supported comprehensively by well-designed resources. Adopting a new way of teaching and learning mathematics will always be a challenge to start with, but you will be taking your first step to truly improving the teaching and learning of mathematics in your school, and increasing the understanding and enjoyment of maths for both your teachers and your children.

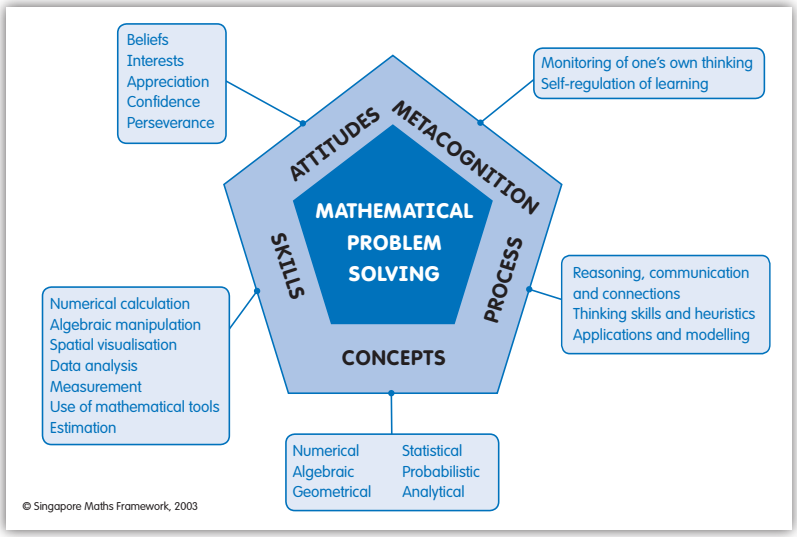
How to teach with *Inspire Maths*

Key features

Teaching for mastery is central to the *Inspire Maths* approach. The books are structured around a rigorous and systematic teaching pathway, which emphasises continuous, active reinforcement of concepts to ensure that children develop deep conceptual understanding. Teaching is based on the principle of children working together to develop understanding before moving on to new concepts. Assessment opportunities throughout ensure that children receive rapid, appropriate intervention, so they progress with their peers and do not fall behind. Teachers are encouraged to use careful questioning, exemplified in the Teacher's Guide, to support children who need additional help, and challenge those requiring more depth. Mathematical conversation is encouraged, ensuring that children of different abilities can support each other and enrich their understanding and vocabulary.

Inspire Maths follows the structure and progression of the curriculum in Singapore which is recognised globally as one of the most impactful ways to teach and learn mathematics. Because it follows this cumulative spiral approach, concepts and skills may be introduced in a different order to that of the 'National curriculum in England: mathematics programmes of study'. It is important that Pupil Textbooks are completed before moving on, so children build on previous knowledge and develop a deep understanding of key concepts.

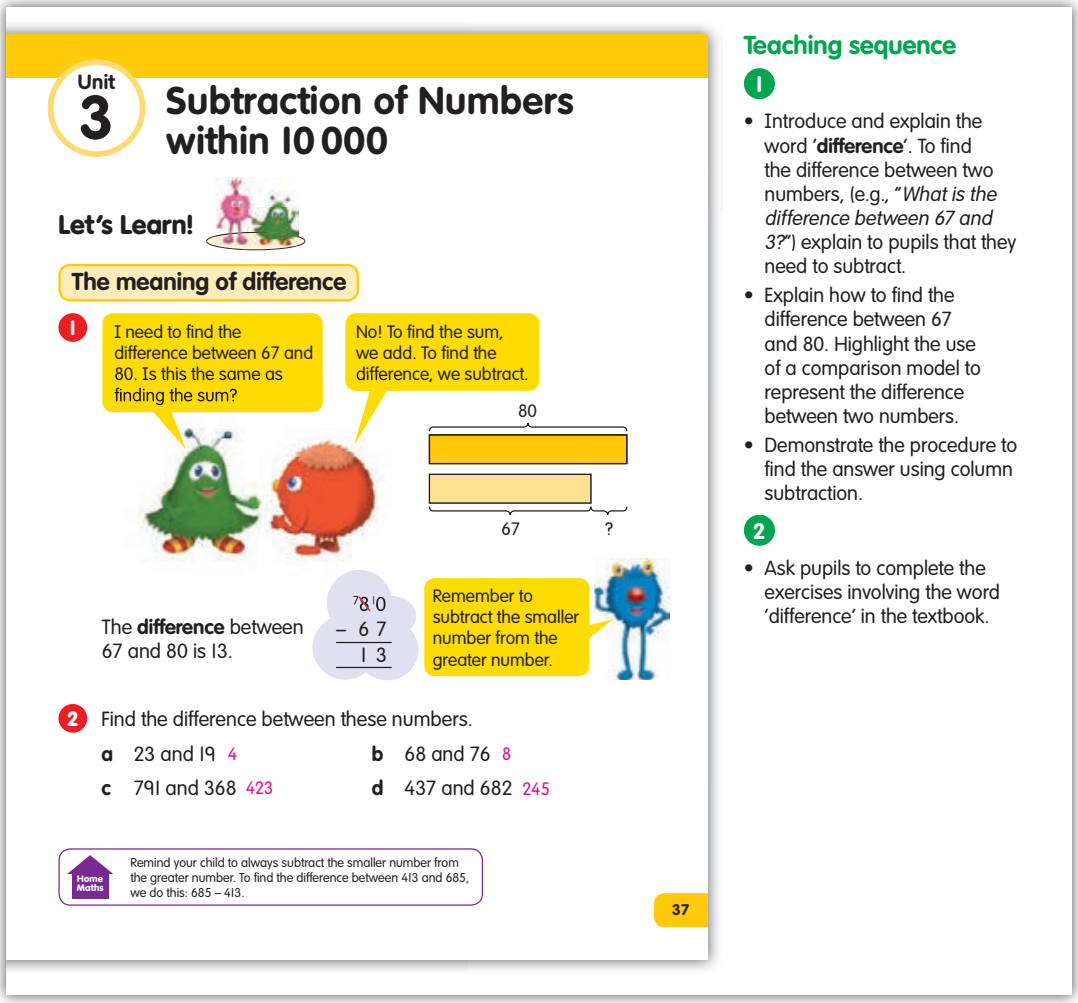
Inspire Maths focuses on developing problem-solving skills, leading children to become confident and efficient problem solvers, which is critical for success at school and later in the work place. This learning framework, with problem solving at its heart, builds on the development of skills, concepts and processes alongside positive and robust attitudes and metacognition in order to achieve the core goal of deep understanding.



The principles that underpin *Inspire Maths*

The concrete–pictorial–abstract (CPA) approach is central to the *Inspire Maths* programme. Carefully considered and constructed representations are used in the Pupil Textbooks and Practice Books to support children's learning. These representations are excellent examples of the concrete apparatus that might support the teaching and learning. In *Inspire Maths* there is a consistent and coherent use of models and images. It is important that children develop a range of visualisations for deep conceptual understanding. You may want to introduce other manipulatives such as Numicon shapes.

The spiral curriculum and the use of variation theory ensure that concepts are frequently revisited and systematically developed to ensure fluency and deep conceptual understanding. Mathematical language is introduced progressively through the programme from the start and children are encouraged to use it in their conversations. The Teacher's Guides clearly outline the language children will be introduced to, which is highlighted in the 'Let's Learn!' sections, followed by opportunities to practise using it in questions and activities.



Unit 3

Subtraction of Numbers within 10 000

Let's Learn!

The meaning of difference

1 I need to find the difference between 67 and 80. Is this the same as finding the sum?

No! To find the sum, we add. To find the difference, we subtract.

80

67 ?

The **difference** between 67 and 80 is 13.

$$\begin{array}{r} 7\,^{7}\!\not{8}\,^{1}0 \\ -\ 6\ 7 \\ \hline 1\ 3 \end{array}$$

Remember to subtract the smaller number from the greater number.

2 Find the difference between these numbers.

a 23 and 19 4 **b** 68 and 76 8

c 791 and 368 423 **d** 437 and 682 245

Home Maths: Remind your child to always subtract the smaller number from the greater number. To find the difference between 413 and 685, we do this: 685 – 413.

37

Teaching sequence

1

- Introduce and explain the word '**difference**'. To find the difference between two numbers, (e.g., "*What is the difference between 67 and 3?*") explain to pupils that they need to subtract.
- Explain how to find the difference between 67 and 80. Highlight the use of a comparison model to represent the difference between two numbers.
- Demonstrate the procedure to find the answer using column subtraction.

2

- Ask pupils to complete the exercises involving the word 'difference' in the textbook.

***Inspire Maths* Teacher's Guide 3A, page 63**

The same mathematical language introduced in the Pupil Textbooks is used in the Pupil Practice Books, Assessment Books, and modelled in the teaching sequence so children have opportunities to use, clarify and practise using correct mathematical vocabulary. This supports children's deep understanding, familiarity and fluency within a concept and ultimately their confidence in mathematics.

In *Inspire Maths* there is significant focus on number and calculation. This emphasis is to ensure that these areas are taught in depth since a secure grasp of number and calculation is fundamental to understanding other areas of mathematics. These firm foundations are critical to ensuring successful progression in mathematics.

All National Curriculum objectives are covered either in the Pupil Textbooks or through additional activities available on *Inspire Maths Online* (www.oxfordowl.co.uk). You can be sure that all relevant curriculum objectives are covered by the end of each key stage in accordance with National Curriculum guidance.

Teaching with *Inspire Maths*

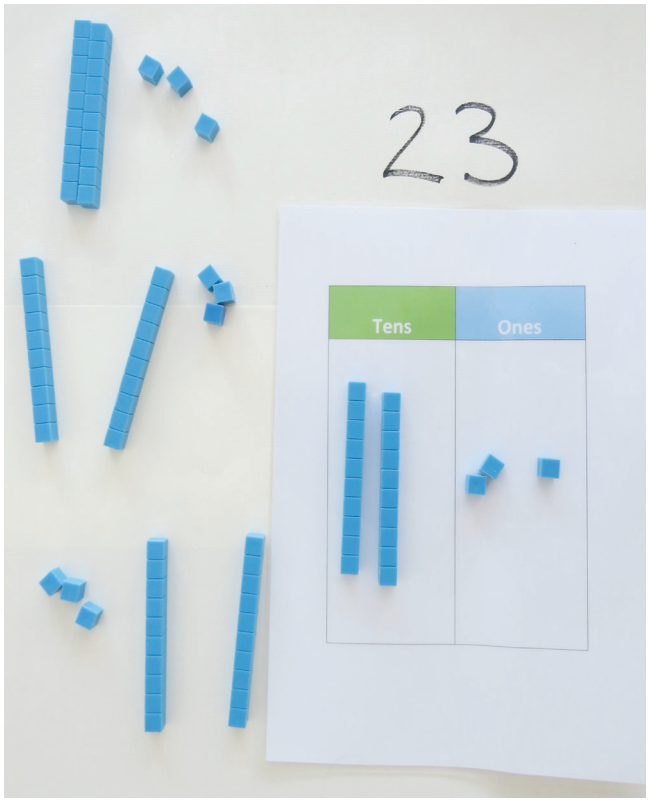
Importance of CPA and using manipulatives

There is growing evidence that if children have memorised and practised procedures without understanding, they may have difficulty in learning later to bring meaning to their work.[1] Many children learn and apply procedural rules without real understanding. They often forget those procedures or remember them incorrectly. To truly understand and enjoy mathematics children need to be procedurally and conceptually fluent: they need to know both 'how to' and 'why'.

Inspire Maths is based on best practice principles and methods of teaching and learning mathematics, including the CPA approach. The CPA approach is based on Bruner's conception of the enactive, iconic and symbolic modes of representation[2]. His research on the development of children looked at how children made sense of the world and focused on three models of representation of mathematical ideas. This heuristic approach has been advocated by the Ministry of Education in Singapore since the 1980s and advocates learning by doing, with the teacher guiding children through and between the three stages.

Stage 1: enactive

This stage focuses on learning through action. At this stage children are manipulating concrete materials in order to access abstract mathematical ideas and derive enactive knowledge; for example, using Numicon shapes to support children's understanding of odd



Grouping using base-ten apparatus and embedding place value

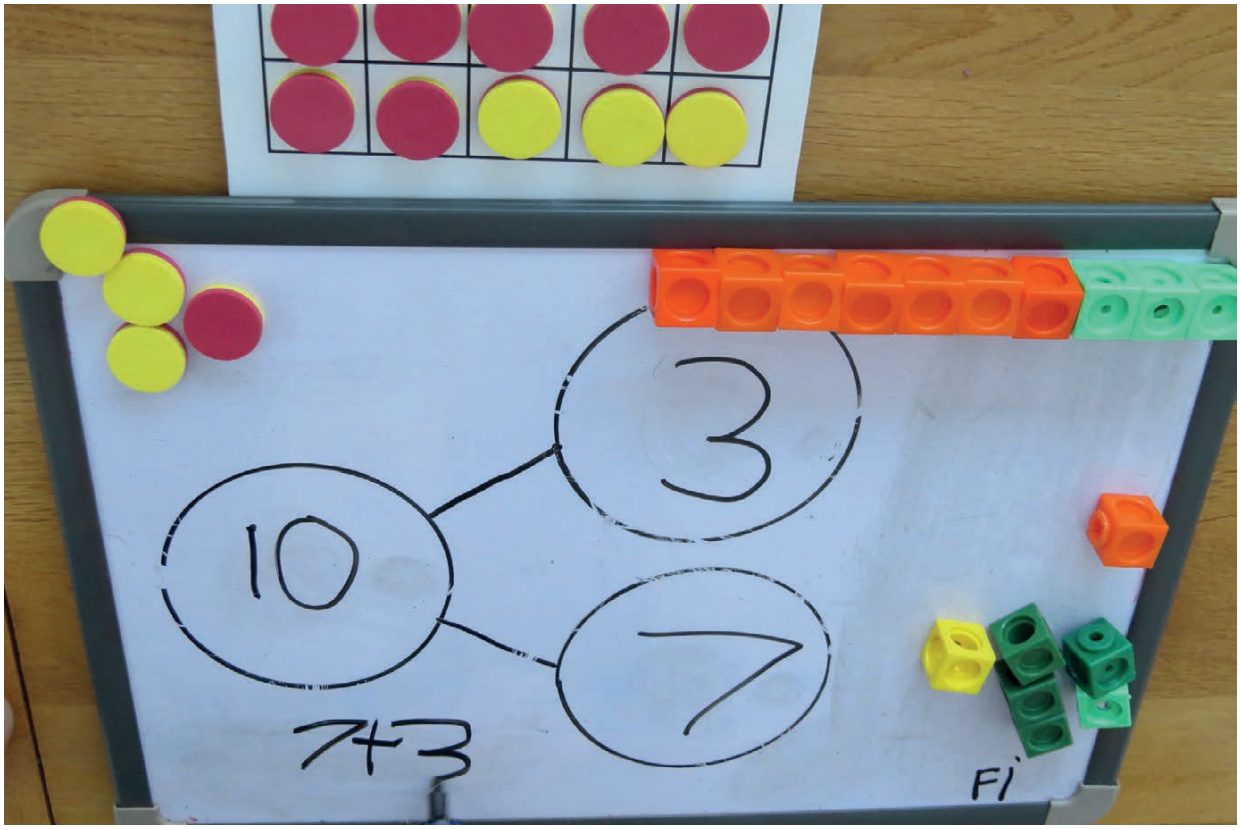
1 Stigler, James & Hiebert, James. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. New York, NY: The Free Press.

2 Jerome Bruner, *The Culture of Education*, Harvard University Press, 1996.

and even numbers and base-ten apparatus to support children's understanding of groups of ten. Children can use apparatus and move it around to understand that 23 is 20 + 3 or 10 + 10 + 3 or 3 + 10 + 10.

Stage 2: iconic

This stage is about learning through image-making – often taken just to mean a visual image, but actually meaning all the senses. This includes children making their own images or drawing a pictorial representation. This is a crucial bridge to accessing and understanding formal abstract knowledge.



Creating number bonds to 10 as a visual image, using part-whole

Stage 3: symbolic

In this stage the learning is supported through language, both spoken and written. When children first encounter the number system they are faced with abstract symbols. As teachers we need to be mindful not to skip through to the abstract or symbolic mode too quickly.

If we move children to the symbolic, or abstract, stage before they're ready, they can start to rely on procedural rules that they use without understanding. This leads to gaps and misconceptions which can have a profound effect on their mathematical development.

Bruner suggests that learners should progress through the stages, but that the best learning takes place when all three modes of learning are used together. His research reinforces the importance of action, imagery and conversation. Bruner's three stages are made more accessible by changing the names to concrete, pictorial and abstract (CPA). It is important to remember that this is not a linear journey and that children, at all ages, will weave backwards and forwards through the CPA approach when working within a conceptual field.

Variation theory

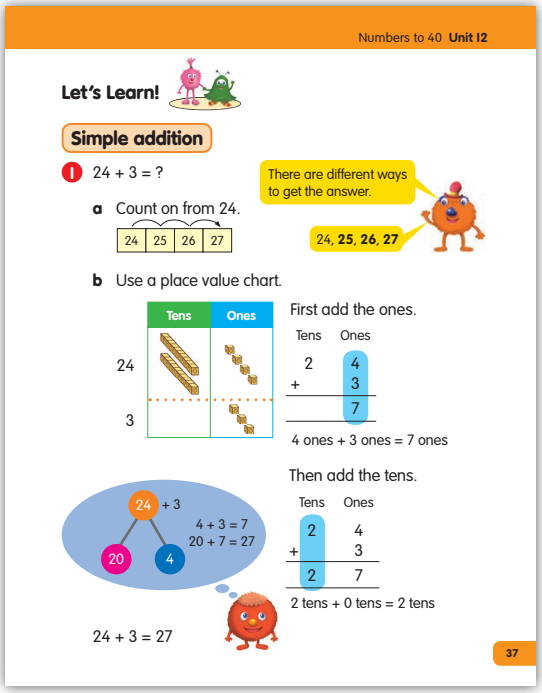
As discussed in **High achievement in mathematics and the importance of high-quality textbooks** (on pages 18–23), textbooks are a highly structured and supportive learning tool for both teachers and learners. The principles underpinning the structure and the development of the *Inspire Maths* Pupil Textbooks are drawn from years of educational research and are proven to support the effective teaching and learning of mathematics. Dienes' theory[3] relating to the teaching and learning of mathematics specifically relates to mathematical variation and perceptual variation, or the 'multiple embodiment principle'. Dienes discussed that, to support children's concept formation and deep understanding, the concept structure should be presented in as many different perceptual variations as possible. In Singapore, educators discuss two types of variation: perceptual and mathematical. In Shanghai, educators talk about procedural and conceptual variation. Many influential mathematicians, such as Anne Watson and John Mason, continue to research the variation theory today. Mason says that variation and invariance are strongly linked since, "invariance only makes sense and is only detectable when there is variation".[4]

"Invariance in the midst of change" (Mason) means asking, "what is the same and what is different?" about, for example, a group of shapes, two or more numbers, geometrical constructions, or algebraic expressions. This encourages children to compare and contrast the structure of both, so developing deep understanding. I

Mathematical variation

When referring to mathematical variation, the mathematical concept stays the same but the variation is in the maths.

In this example, children add a 2-digit number to a 1-digit number, first by adding the ones without regrouping. They progress to two 2-digit numbers, adding the tens without regrouping. They go on to adding a 2-digit number to a 2-digit number but adding the ones without regrouping. Later they will add a 2-digit number to a 1-digit number, adding the ones and regrouping. The mathematics varies in very small conceptual steps, challenging children to use their maths skills flexibly and appropriately, deepening understanding. I



***Inspire Maths* Pupil Textbook 1B, page 37**

3 Dienes, Z. (1960). Building Up Mathematics (4th edition). London: Hutchinson Educational Ltd.

4 Mason, John. (2007). Research and practice in algebra: Interwoven influences. Open University UK. P.917. Available here: https://www.researchgate.net/publication/266570395_RESEARCH_AND_PRACTICE_IN_ALGEBRA_INTERWOVEN_INFLUENCES

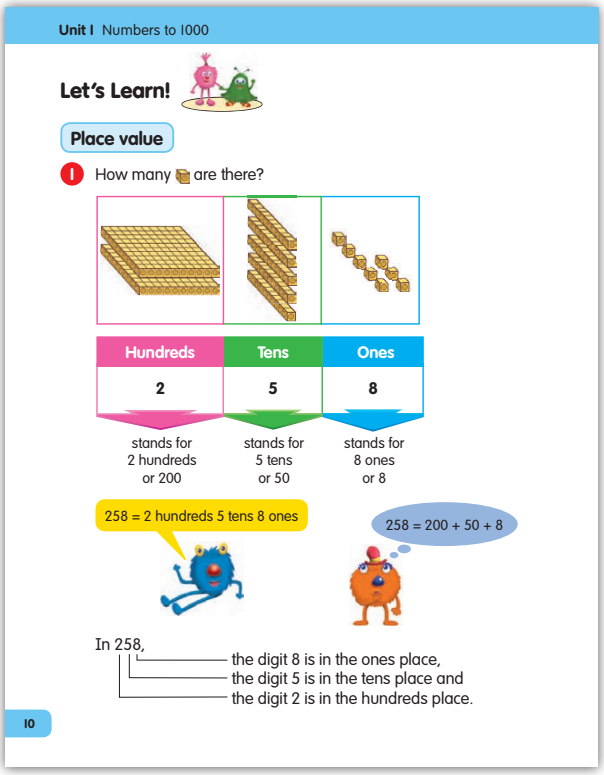
Perceptual variation

With perceptual variation, the mathematical concept is the same but the children are presented with different ways to perceive the mathematical ideas.

In this example, children can see 258 represented by base-ten apparatus, how this relates to the numbers and positions in the place value chart, and what the number represents in unit form, for example, 258 would be 2 hundreds 5 tens 8 ones. 258 is written in expanded form as 200 + 50 + 8, supported by base-ten apparatus and place value charts, or in abstract form as 200 + 50 + 8 = 258. 1

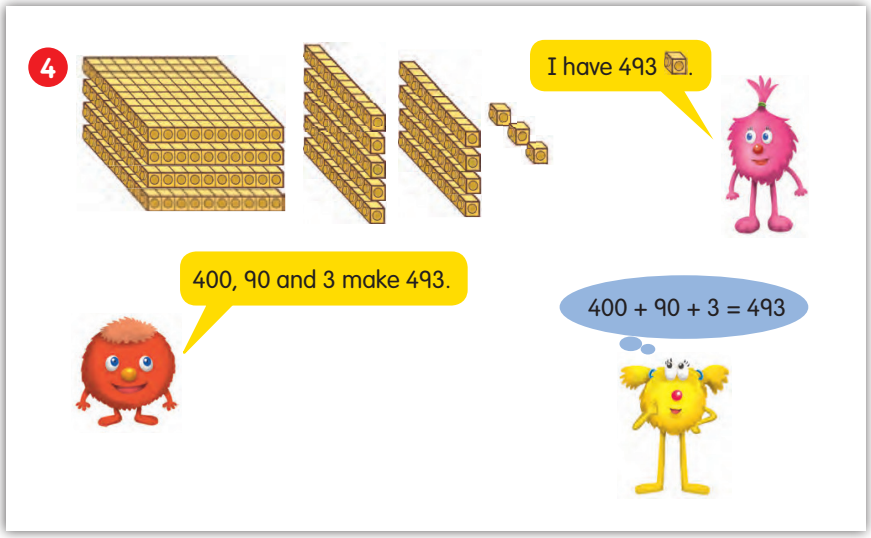
Children practise these elements on the following pages of Pupil Textbook 2A, and have opportunities for further practice and resolving errors and misconceptions in the Simmering Skills Activity on *Inspire Maths Online* (*Inspire Maths* 2, Activity 1). 2

1



***Inspire Maths* Pupil Textbook 2A, page 10**

2



***Inspire Maths* Pupil Textbook 2A, page 12**

Summary

Throughout *Inspire Maths* there is a consistent use of models and images using the CPA approach, and of perceptual and mathematical variation. This ensures that children are offered a variety of opportunities to develop deep understanding of mathematical structures and ideas. New concepts are introduced concretely using representations and manipulatives so that children learn through doing. These are then developed and reinforced more abstractly using the CPA approach. Alongside this there is a very careful use of perceptual and mathematical variation which builds familiarity and develops fluency. Using the CPA approach and variation theory in everyday teaching is a crucial part of supporting and developing our children's mathematical thinking and teaching for mastery.

Preparing to teach with *Inspire Maths*

Inspire Maths teaching materials are designed so that all children can progress together, introducing concepts through direct teaching to the whole class.

Working through the content with children at a pace that enables them to study concepts in depth, and progressing when the large majority have understanding, is key for developing deep conceptual understanding. Our assessment of when to move children on is then based on evidence that they are secure in the maths but have also demonstrated depth, for example, mathematical reasoning through less routine questions or problem solving in different contexts.

Children who work in mixed-ability pairs tend to make more progress, as they are all seen to have a lot to offer and a "mathematical voice". Teachers are often surprised when children who they thought were the quick graspers do not have the understanding to explain their reasoning. When working in pairs or groups children are actively learning together and supporting each other's learning, and so fostering an environment of cooperation and achievement. One school using *Inspire Maths* says how working in this way has helped with progress for all.

> "More children are working at greater depth. Children who would have been lower ability are now not labelled as such and many children have made significant progress in their year groups."
>
> Judith Myhill, St Thomas CE Primary School

If you currently arrange your children in ability groupings you may need to consider a move away from this set-up. Your children will be working in mixed-ability pairs and may not always sit with the same talk-partner or even on the same table.

There has been some research into whether children who are placed in ability sets at an early age tend to perform to the level of their teachers' expectation and the gap in ability tends to widen as they progress through their primary years.[5] The findings of the Millennium Cohort Study, a major research exercise which is following the lives of 19 000 children born in the UK in 2000–2001 reports that,

> *"…streaming in primary schools would appear to increase the gap between higher- and lower-attaining pupils, and also to accentuate socio-economic differences, because more of those from poorer backgrounds tend on average to be in the lower streams."*

Other considerations for setting up your classroom are whether to have a specific area for teaching the whole class (this may be a carpet area for younger years), or when you want to focus on a particular group of children (those struggling or those grasping new ideas quickly), and what maths equipment you have available. Ideally you should avoid sharing equipment with another class as different types of equipment should be available for all children all of the time, if possible on their tables or easily accessible.

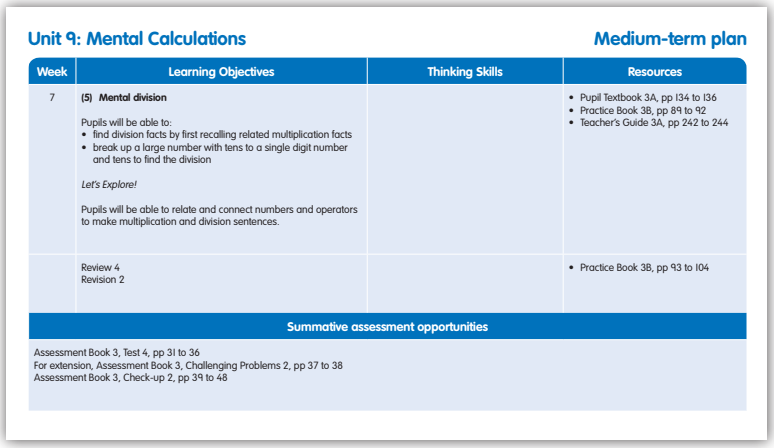
5 http://www.cls.ioe.ac.uk/news.aspx?itemid=3064&itemTitle=Streaming+pupils+by+ability+in+primary+school+widens+the+attainment+gap&sitesectionid=27&sitesectiontitle=News

Using the Teacher's Guides

As well as this Getting Started Guide, there are two Teacher's Guides per *Inspire Maths* level, providing planning and implementation support, and a suggested teaching sequence corresponding to each Pupil Textbook page. The Teacher's Guide gives teachers guidance on appropriate points for formative assessments throughout the teaching sequence. They are carefully designed to help teachers assess children's understanding, and their use of vocabulary and mathematical connections. The pedagogical guidance introduces the theory underpinning the approach, the features of the Pupil Textbook structure and how teachers can use them. A step-by-step teaching sequence highlights points for intervention to address gaps in understanding and opportunities for practice and enrichment through the Pupil Practice Books. The Teacher's Guide is designed for non-specialist mathematics teachers to deliver the content.

Long-term planning

Each Teacher's Guide contains long- and medium-term plans. The long-term plan gives an overview of the units and key concepts in that particular Pupil Textbook, for example, Teacher's Guide 3A outlines the units in Pupil Textbook 3A. There is also guidance for when to use the reviews and revisions in the Pupil Practice Books and the tests in the Assessment Books. The reviews, revisions and tests are usually highlighted after two units.



Unit 9: Mental Calculations — **Medium-term plan**

Week	Learning Objectives	Thinking Skills	Resources
7	**(5) Mental division** Pupils will be able to: • find division facts by first recalling related multiplication facts • break up a large number with tens to a single digit number and tens to find the division *Let's Explore!* Pupils will be able to relate and connect numbers and operators to make multiplication and division sentences.		• Pupil Textbook 3A, pp 134 to 136 • Practice Book 3B, pp 89 to 92 • Teacher's Guide 3A, pp 242 to 244
	Review 4 Revision 2		• Practice Book 3B, pp 93 to 104

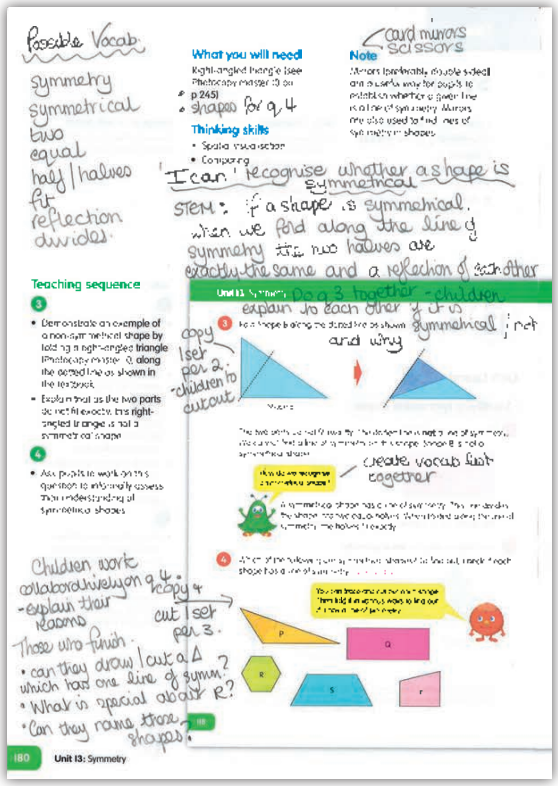
Summative assessment opportunities

Assessment Book 3, Test 4, pp 31 to 36
For extension, Assessment Book 3, Challenging Problems 2, pp 37 to 38
Assessment Book 3, Check-up 2, pp 39 to 48

***Inspire Maths* Teacher's Guide 3A, page 231**

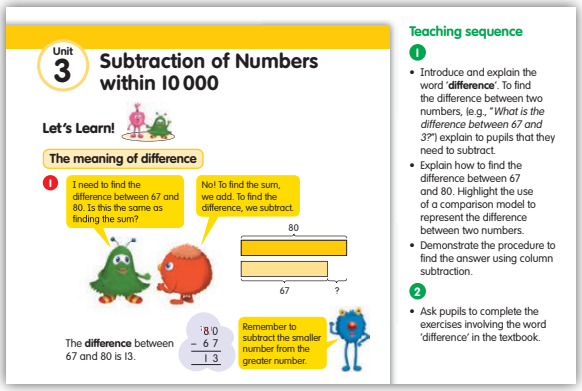
Medium-term planning

The medium-term plans indicate how many weeks each section in a unit may take, together with the learning objectives, an outline of the thinking skills and Pupil Textbook resources you will need. The time given is only an indication: it is important to use your own professional judgement as to when to move your class on, being aware that some children may need extra support and further practice. The Practice Books and Assessment Books can offer valuable evidence of progression and support you in deciding when to move children on. Annotating the Teacher's Guides can create a record of how long you spent on a particular section for when that content is revisited the following year with a different class.



***Inspire Maths* Teacher's Guide 4B, page 180 (annotated)**

The Teacher's Guides will give you guidance on how to get started and a suggested teaching sequence for each page of the Pupil Textbook. Make sure you are familiar with the learning objectives, key concepts, key thinking skills and problem-solving strategies you will be introducing and working on with your class. There is a suggested list of equipment to have available, which can be supplemented as necessary. Mathematical language introduced in the unit is listed and explained.


Unit 3 Subtraction of Numbers within 10 000

Let's Learn!

The meaning of difference

I need to find the difference between 67 and 80. Is this the same as finding the sum?

No! To find the sum, we add. To find the difference, we subtract.

80

67 ?

The difference between 67 and 80 is 13.

80
− 67
13

Remember to subtract the smaller number from the greater number.

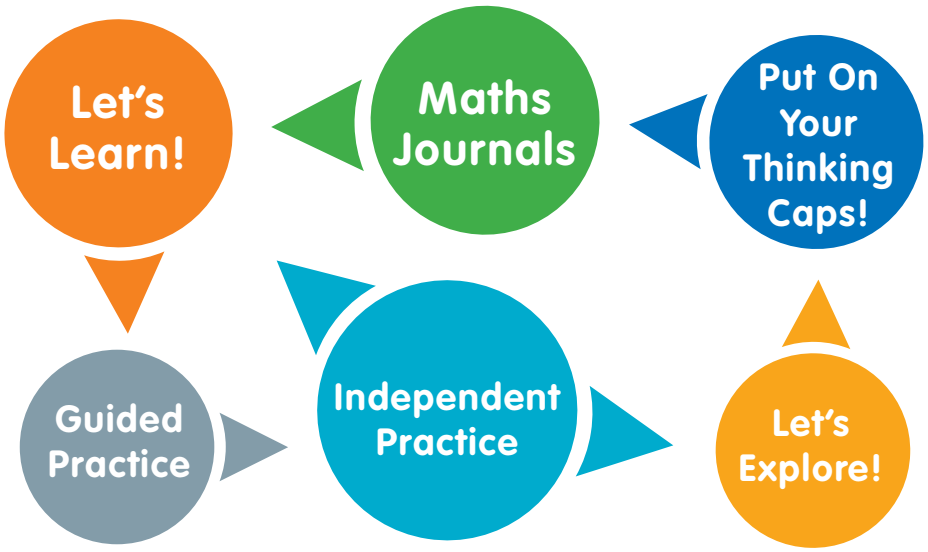
Teaching sequence

1
- Introduce and explain the word '**difference**'. To find the difference between two numbers, (e.g., "*What is the difference between 67 and 37*") explain to pupils that they need to subtract.
- Explain how to find the difference between 67 and 80. Highlight the use of a comparison model to represent the difference between two numbers.
- Demonstrate the procedure to find the answer using column subtraction.

2
- Ask pupils to complete the exercises involving the word 'difference' in the textbook.

***Inspire Maths* Teacher's Guide 3A, page 63**

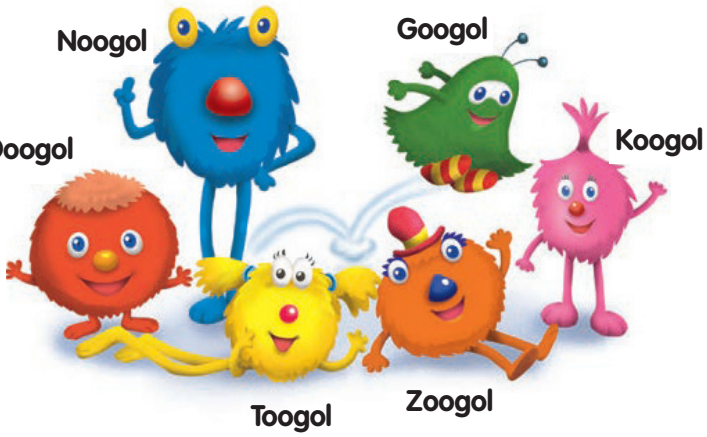
The teaching sequence provides step-by-step guidance to help you meet the learning objectives with suggestions for questions to ask children. It also includes careful questioning to support the use of concrete apparatus. Opportunities for higher order questioning help children to become confident problem solvers, and encourage mathematical conversation to explore and develop reasoning skills. It is important to model higher order questioning so that children know how to ask questions of themselves. The teaching sequence will also highlight problem-solving strategies and provide support to encourage purposeful and robust mathematical conversations.



A suggested teaching sequence. Note that the size of each circle is not representative of the time needed for each area, as this will be guided by your professional judgement or the area of mathematics that you are working on.

Inspire Maths characters

The characters support and guide children throughout the programme from *Inspire Maths* 1 to *Inspire Maths* 6. There is a family of six characters and all of the names, Googol, Noogol, Koogol, Ooogol, Zoogol and Toogol, are variations of Googol. Googol is a very large number (10^{100} or 10 to the power of 100). The characters pop up throughout the books offering tips, hints and suggestions and demonstrate that they support each other in the same way that the children will be supported by you.



'Let's Learn!' to build firm foundations

Each unit in the Pupil Textbooks starts with several 'Let's Learn!' sections to support your direct teaching. Mathematical concepts are carefully introduced in these sections. Concepts are broken down into small steps for children to follow and refer back to easily. These steps are consistently introduced using the CPA approach. As the small steps are laid out explicitly in each unit, children can refer back to previous steps when needed. When teaching from the 'Let's Learns', you will be "imparting the knowledge", as Dr Fong, the author of *Inspire Maths,* would say.

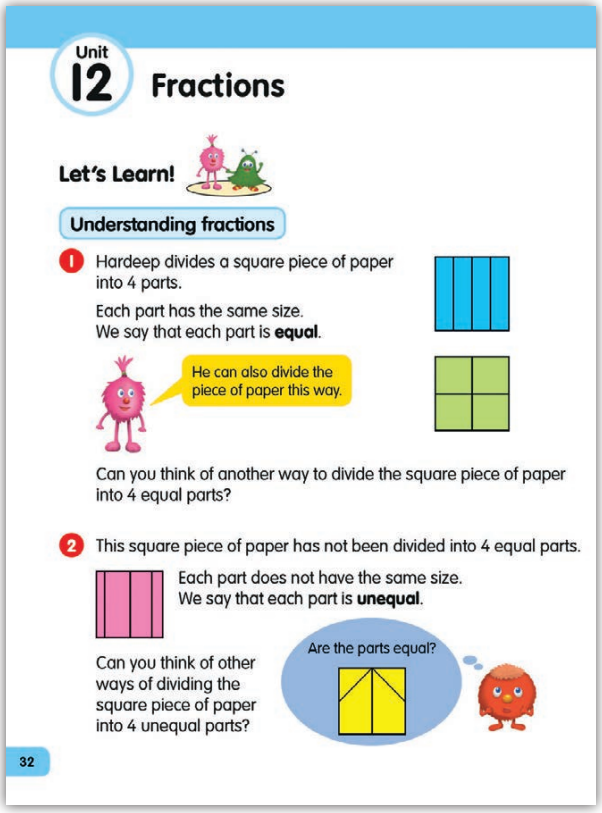
Your direct teaching will not be prescriptive in nature. Instead, you will be interacting with children and engaging them in mathematical conversations, using differentiated questions and allowing time for children to discuss their thoughts, answers and reasoning with partners, in groups or with the whole class. Listening to children's mathematical conversations, and observing their use of concrete apparatus and their approach to an activity, allows you to assess understanding.

Consider whether children will sit at tables or elsewhere, and whether they will be recording on their whiteboards or maths journals to show their thinking or answer your questions. It is good to remember that having children facing you during the lesson, by whatever means, reduces distractions and improves attention. Many teachers find that having a visualiser really supports their teaching. In addition, around a quarter of the 'Let's Learns' are also available on *Inspire Maths Online*, for use on an Interactive Whiteboard. When working through the 'Let's Learns', you will find opportunities to assess each child's understanding through listening to their mathematical conversations, observing their use of concrete apparatus and how they approach an activity.

Example

In this 'Let's Learn!', children are introduced to the concept of a whole being divided into equal and unequal parts. The Teacher's Guide suggests that you use squares of paper to model the equal and unequal parts. You may choose to revisit two equal parts before progressing to four as modelled within the Pupil Textbook. Remember that with the CPA approach you and the children will be using the concrete resources alongside the book illustrations, therefore you may wish to also provide children with their own squares of paper to explore the equal and unequal parts of a whole. Here you will also see that the characters provide support and guidance for the children. Koogol extends Hardeep's thinking to show that there is more than one solution, whereas Ooogol questions whether a particular representation contains equal parts. I

I



Unit 12 Fractions

Let's Learn!

Understanding fractions

1 Hardeep divides a square piece of paper into 4 parts.

Each part has the same size.
We say that each part is **equal**.

He can also divide the piece of paper this way.

Can you think of another way to divide the square piece of paper into 4 equal parts?

2 This square piece of paper has not been divided into 4 equal parts.

Each part does not have the same size.
We say that each part is **unequal**.

Can you think of other ways of dividing the square piece of paper into 4 unequal parts?

Are the parts equal?

32

***Inspire Maths* Teacher's Guide 2B, page 32**

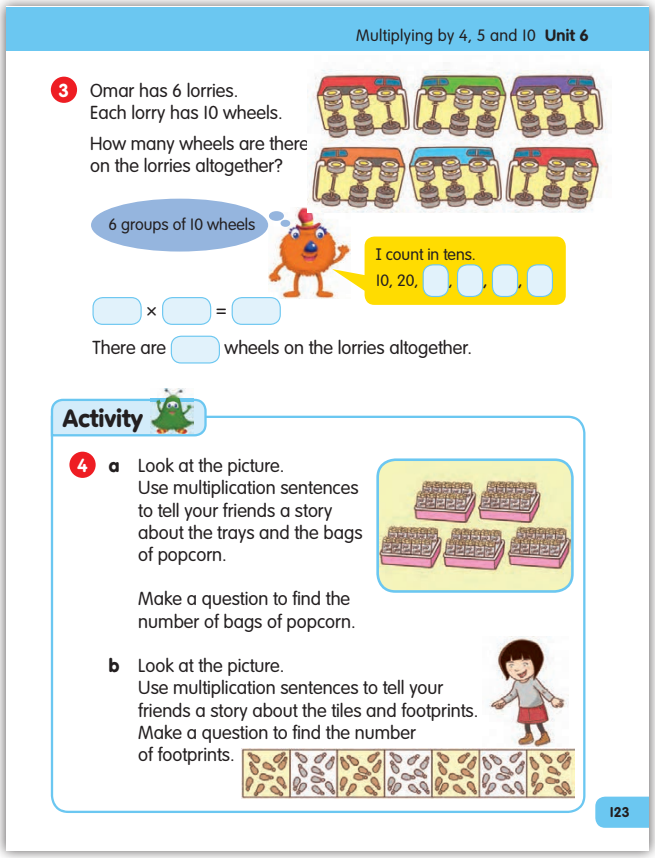
'Guided Practice' to develop deep understanding

After a concept has been introduced in the 'Let's Learn!', guided and collaborative practice develops the deep understanding required for mastery. 'Guided Practices' are indicated by empty answer boxes or the 'Activity' subheading. The Teacher's Guides offer support in questioning and guiding children's understanding of the concept, encouraging interaction between children and with you. It is important to remember that these empty boxes do not mean "fill in the answer". Children work collaboratively, in pairs or small groups, to develop their mathematical language and reasoning.

You can guide those who need support to think of other ways to get to the answer and also probe for common misconceptions. Encourage children to explore using different manipulatives, observing how they use the concrete apparatus and listening to their mathematical conversations. Whilst children are working through the 'Guided Practice' and activity questions you will have the opportunity to continue to assess: which children require further support, which need to consolidate their learning, and which will need to go deeper with further challenge.

Example

In the 'Let's Learn!' that precedes this guided and collaborative practice, children have explored the concept of multiplying 10 and used skip-counting in tens to find 10 times table facts. There are two elements to this example. The first part mirrors the style of question that children have completed during the 'Let's Learn!' and Zoogol supports their thinking and also starts their skip-counting. You will be encouraging children to say the number sequence and look for patterns in the sequence. The second part is the 'Activity' which uses the children's new learning to see if they can work collaboratively or with adult support to write stories and multiplication sentences involving the use of multiplication. Remember that with the CPA approach you and the children will be using the concrete resources alongside the book illustrations. The children will be asked to discuss the questions and explain their answers to each other and to the whole class. They have used bundles of ten straws in the previous examples to count in tens and have also used their fingers to keep a tally when skip-counting in tens. Therefore you may choose to continue with these approaches.



Multiplying by 4, 5 and 10 **Unit 6**

3 Omar has 6 lorries.
Each lorry has 10 wheels.
How many wheels are there on the lorries altogether?

6 groups of 10 wheels

I count in tens.
10, 20, , , , ,

× =

There are wheels on the lorries altogether.

Activity

4 a Look at the picture.
Use multiplication sentences to tell your friends a story about the trays and the bags of popcorn.

Make a question to find the number of bags of popcorn.

b Look at the picture.
Use multiplication sentences to tell your friends a story about the tiles and footprints.
Make a question to find the number of footprints.

123

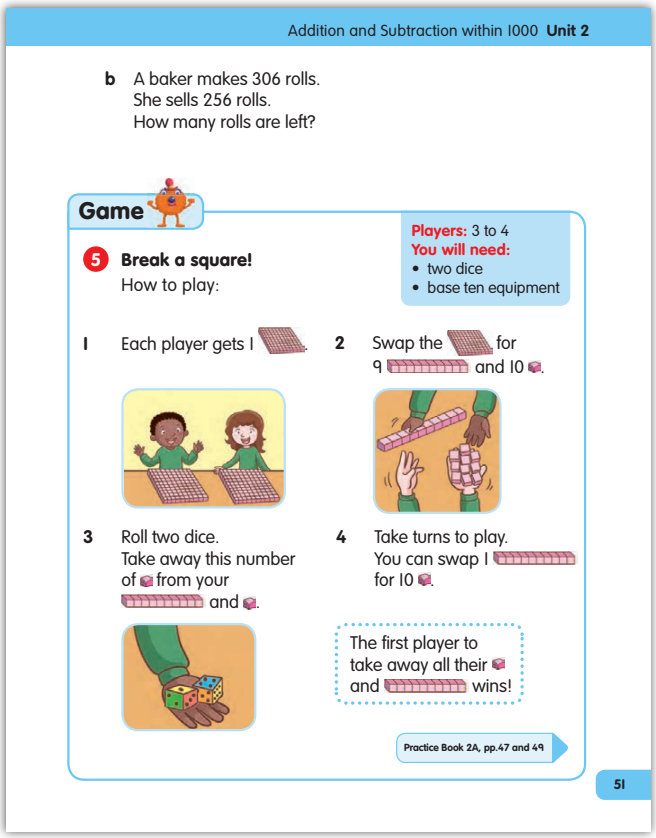
***Inspire Maths* Pupil Textbook 2A, page 123**

'Let's Explore!' and 'Games' to investigate and apply learning

In the Pupil Textbooks, engaging 'Games' (*Inspire Maths* 1–4 only) and investigative 'Let's Explore!' activities encourage children to apply concepts they have been learning and to practise applying their learning further by working collaboratively in small groups, in pairs or individually. Children will be exploring concepts whilst providing teachers with an opportunity to assess their reasoning skills by observing how they approach the tasks. The 'Let's Explore!' activities and 'Games' have been carefully designed to support children with frequent opportunities to develop deeper understanding, to make connections through mathematical reasoning and to engage in mathematical conversations using precise vocabulary.

Example

Prior to this 'Game', children have been using concrete representations to explore regrouping from hundreds to tens in subtraction. The 'Game' requires three or four players, two dice and base-ten apparatus as concrete resources. Through this game children will explore further subtracting by taking away from 100 to 0 using the base-ten apparatus and exchanging one 10 for ten ones when necessary. 1



Addition and Subtraction within 1000 **Unit 2**

b A baker makes 306 rolls.
She sells 256 rolls.
How many rolls are left?

Game

5 **Break a square!**
How to play:

Players: 3 to 4
You will need:
- two dice
- base ten equipment

1 Each player gets 1 .

2 Swap the for 9 and 10 .

3 Roll two dice.
Take away this number of from your and .

4 Take turns to play.
You can swap 1 for 10 .

The first player to take away all their and wins!

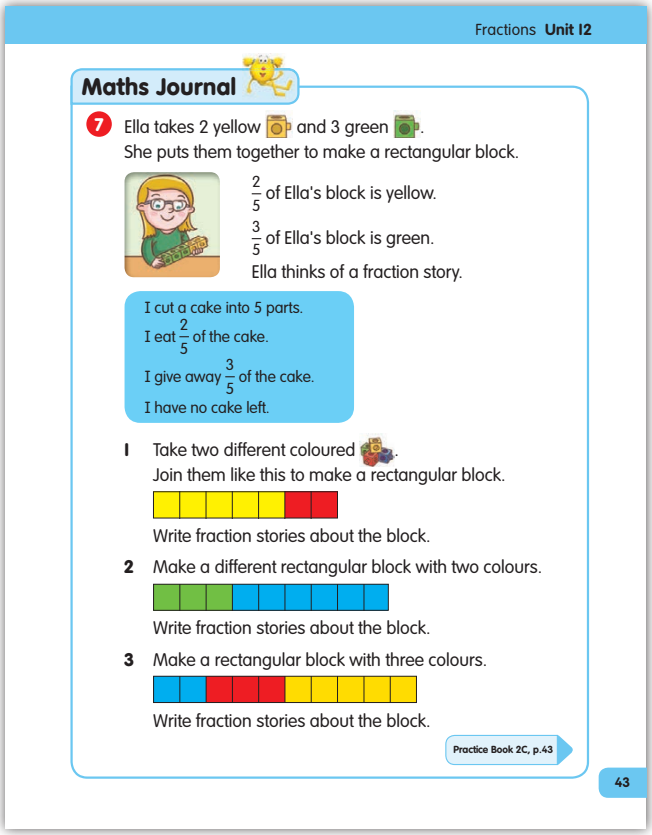
Practice Book 2A, pp.47 and 49

51

***Inspire Maths* Pupil Textbook 2B, page 51**

'Maths Journals' to reflect

The 'Maths Journal' is where each child records their mathematical thinking and reflects on their learning. A typical 'Maths Journal' would be a child's own exercise book. The 'Maths Journal' activities are designed to support children to reflect upon their learning. They also develop into a valuable assessment tool that will show progress over time. They create an opportunity for children to share their thinking and progress and help to establish a sense of pride in their achievements. In this book they can also record their thoughts, ideas, findings and their response to the activities they complete in other sections of the Pupil Textbook.



Fractions **Unit 12**

Maths Journal

7 Ella takes 2 yellow and 3 green.
She puts them together to make a rectangular block.

$\frac{2}{5}$ of Ella's block is yellow.

$\frac{3}{5}$ of Ella's block is green.

Ella thinks of a fraction story.

I cut a cake into 5 parts.
I eat $\frac{2}{5}$ of the cake.
I give away $\frac{3}{5}$ of the cake.
I have no cake left.

1 Take two different coloured .
Join them like this to make a rectangular block.

Write fraction stories about the block.

2 Make a different rectangular block with two colours.

Write fraction stories about the block.

3 Make a rectangular block with three colours.

Write fraction stories about the block.

Practice Book 2C, p.43

43

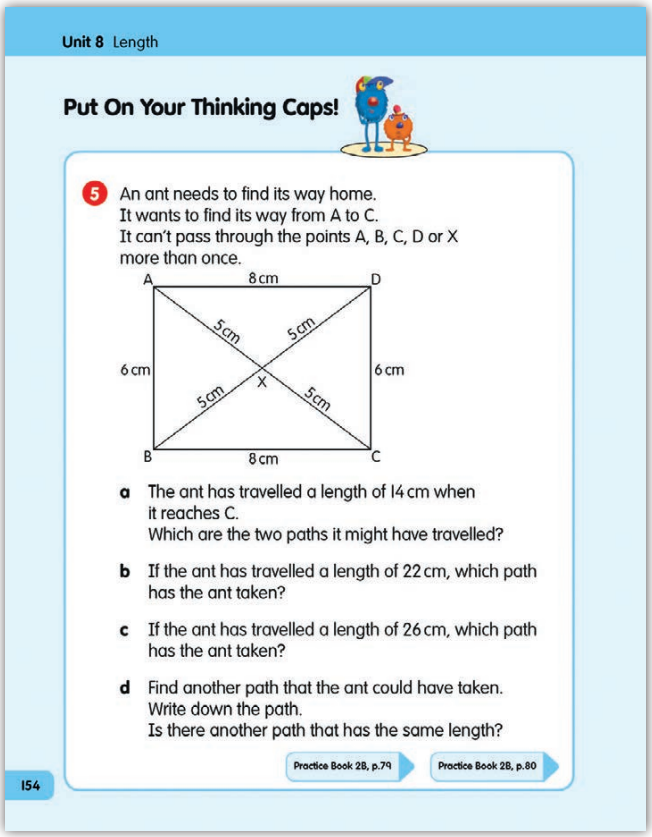
***Inspire Maths* Pupil Textbook 2B, page 43**

Example

Prior to this example, children have been using model drawings and cubes to represent fractions. They have also been visualising and analysing parts and whole. This 'Maths Journal' task challenges children to reflect on the fraction concepts they have experienced so far. You may choose to guide children to recall and use the concepts to tell the stories based on the model diagrams. Whilst the diagrams are illustrated it is suggested that children build their own models using cubes. There is also a scaffolded question that will support children in writing their fractions stories.

'Put On Your Thinking Caps!' to challenge

The 'Put On Your Thinking Caps!' activity often appears at the end of a unit and challenges children to solve non-routine problems. These activities have been designed to enable children to draw on prior knowledge as well as newly learnt concepts. To complete these children will need to use problem-solving strategies and critical thinking skills such as comparing and sequencing. They are also valuable for assessment to determine whether a child has developed a deep understanding of a concept either through their oral or written explanation, their concrete modelling or their pictorial representations. Children who grasp a concept more quickly than their peers may access these questions earlier, but it is essential that all children are given the opportunity to be challenged and assessed for mathematical fluency and greater depth of understanding.



Unit 8 Length

Put On Your Thinking Caps!

5 An ant needs to find its way home.
It wants to find its way from A to C.
It can't pass through the points A, B, C, D or X more than once.

a The ant has travelled a length of 14 cm when it reaches C.
Which are the two paths it might have travelled?

b If the ant has travelled a length of 22 cm, which path has the ant taken?

c If the ant has travelled a length of 26 cm, which path has the ant taken?

d Find another path that the ant could have taken.
Write down the path.
Is there another path that has the same length?

Practice Book 2B, p.79 Practice Book 2B, p.80

154

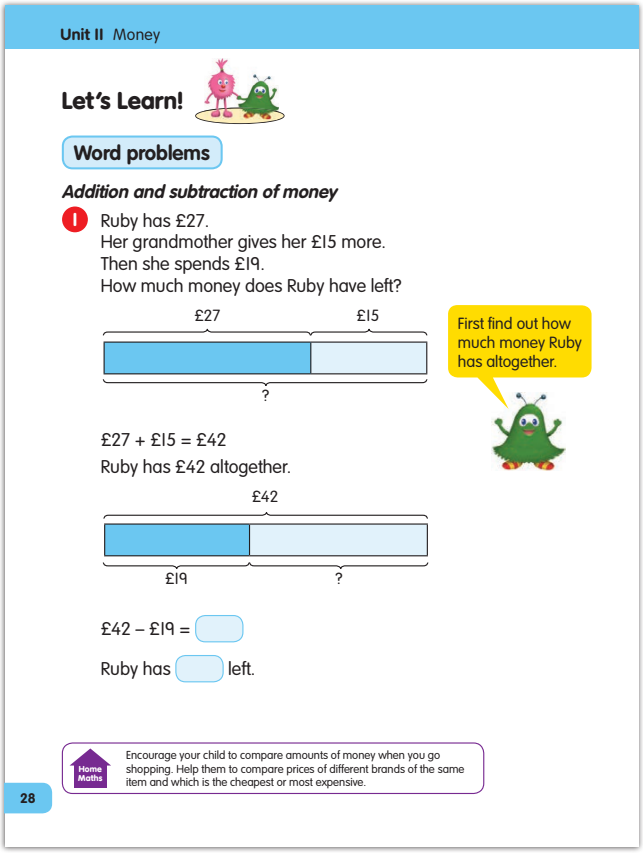
***Inspire Maths* Pupil Textbook 2A, page 154**

Example

This 'Put On Your Thinking Caps!' activity concludes children's study of length. During this unit children have measured, compared and calculated in metres and centimetres. This activity follows on from one-step and two-step problems involving centimetres. Look for children who can quickly identify the possible routes the ant took and who can then transfer these possible pathways to the specified questions. Are the children systematic in their approach? Can they find alternative unique paths for the ant to travel?

'Home Maths' to encourage mathematical conversations

Throughout the Pupil Textbooks there are 'Home Maths' activities for you to use. These suggestions are for parents and carers to work through with their children, so that they can explore maths further outside the classroom, engage in mathematical conversations and develop a home-school partnership. Any equipment required should be available in the home. Further home activities with guidance for parents, such as questions to ask and what to look and listen for, are available on *Inspire Maths Online*. These are a powerful way to involve parents and carers in their children's mathematical learning. They also help children to see maths in the world around them.



Unit 11 Money

Let's Learn!

Word problems

Addition and subtraction of money

1 Ruby has £27.
Her grandmother gives her £15 more.
Then she spends £19.
How much money does Ruby have left?

First find out how much money Ruby has altogether.

£27 + £15 = £42
Ruby has £42 altogether.

£42 – £19 = ☐

Ruby has ☐ left.

Home Maths: Encourage your child to compare amounts of money when you go shopping. Help them to compare prices of different brands of the same item and which is the cheapest or most expensive.

28

***Inspire Maths* Pupil Textbook 2B, page 28**

Example

This 'Home Maths' activity follows on from children using 'adding on' and 'taking away' when solving money word problems. 1

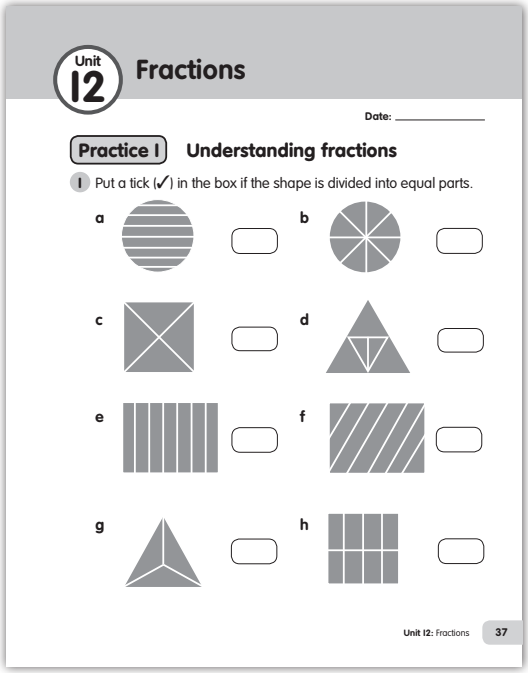
Practice Books to develop fluency and consolidate

Practice Books are an essential component of *Inspire Maths* and of any mastery programme. They contain a wealth of activities and questions to develop confident and fluent mathematicians who are working towards a deep conceptual understanding. The questions are carefully constructed to reinforce children's understanding and provide varied and frequent practice. Independent practice and consolidation are essential and integral parts of the mastery approach. Practice Books also give you the valuable opportunity to consider each individual child's progress. Each child will complete all or selected elements of the books, as you direct. There are four Practice Books each for *Inspire Maths* 1–3 and two Practice Books each for *Inspire Maths* 4–6.

Guidance on when to use the Practice Books can be found in the Pupil Textbooks and in the Teacher's Guides. Some units have a few pages of content before linking to the Practice Books. However, there should be daily opportunities for independent practice: investigating or reasoning with manipulatives; playing games or engaging in mathematical conversations.

There are various activity types in the Practice Books. Each unit begins with well-structured questions within the 'Practice' section. These help children to consolidate the key concepts from the Pupil Textbook. They are to be completed independently and often feature guidance from the characters to support children. You may choose to annotate children's Practice Books to record whether concrete resources and which ones, have been used to support their thinking.

After the 'Practice' sections have consolidated the learning, children are provided with 'Challenging Practice' and 'Problem Solving' questions. These questions use new and different contexts, providing opportunities for critical thinking and mathematical reasoning to develop fluency and deepen understanding. The 'Problem Solving' questions are often word problems and may require children to draw representations of their thinking. The regular reviews help children to reinforce and consolidate learning and build understanding. The 'Revisions', which appear at the end of the corresponding Pupil Textbooks, draw from a range of preceding topics, concepts and strands for complete consolidation of each Pupil Textbook. The final type of activity within the Practice Books is the 'Maths Journal', where children showcase their understanding of the concepts covered by creating their own questions or statements to explain their mathematical thinking.


Unit 12 Fractions

Date: _____

Practice 1 Understanding fractions

1 Put a tick (✓) in the box if the shape is divided into equal parts.

a b c d e f g h

Unit 12: Fractions 37

***Inspire Maths* Practice Book 2C, page 37**

Example

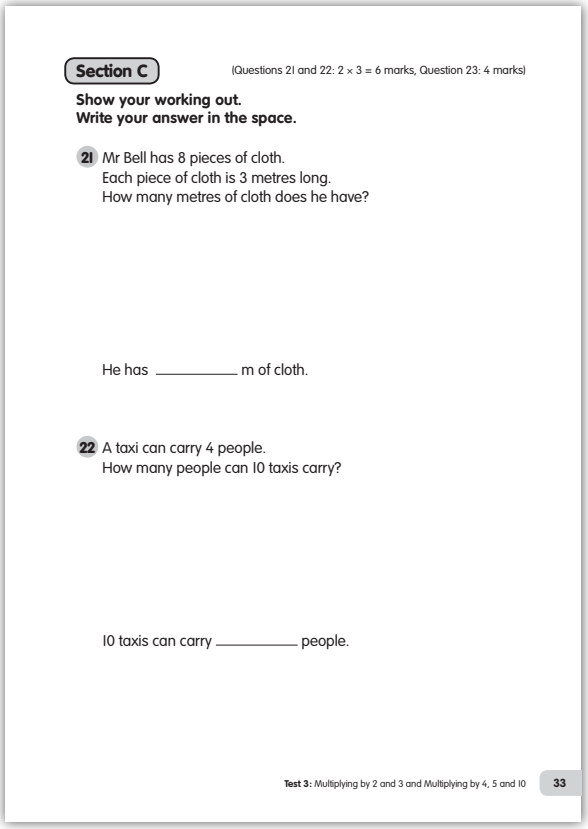
This question follows on from the introductory 'Let's Learn!', 'Let's Explore!' and a 'Guided Practice' which use the thinking skills of analysing parts and whole and visualising equal parts. This question can identify children who may have common misconceptions when finding fractions of amounts when they need to analyse parts and wholes and identify equal parts. 1

Assessment Books to create a record of progress

The Assessment Books can be used for both formative and summative assessment, covering the key learning objectives from the Pupil Textbook. There are four check-ups for each set of Pupil Textbooks which revisit the previous units and provide opportunities to check children's understanding and monitor their progress over these units. The assessments use unfamiliar contexts so children can apply their understanding to challenging questions. You should not expect all children to be able to tackle all the questions.

Ideally, each child should be able to keep their Assessment Book throughout their school career. Remember that, for example, *Inspire Maths* I isn't only for Year I, and some questions could be useful in Years 2 or 3. The questions in the Assessment Books range from the straightforward to ones which focus on depth and reasoning, and are therefore still challenging for older children. The questions can also be used for establishing and evidencing progress and assessment for teaching and intervention.

Assessment Book content can be used as tests at the end of units of work, or as a resource to build your own sets of questions. You may also choose to use some for further challenge or as a homework activity. You can set questions as a 'cold assessment' to assess knowledge before you teach a unit and again as a 'hot assessment' after teaching to check understanding and show evidence of progress.



Section C (Questions 21 and 22: 2 × 3 = 6 marks, Question 23: 4 marks)

Show your working out.
Write your answer in the space.

21 Mr Bell has 8 pieces of cloth.
Each piece of cloth is 3 metres long.
How many metres of cloth does he have?

He has _____ m of cloth.

22 A taxi can carry 4 people.
How many people can 10 taxis carry?

10 taxis can carry _____ people.

Test 3: Multiplying by 2 and 3 and Multiplying by 4, 5 and 10 **33**

***Inspire Maths* Assessment Book 2, page 33**

Example

These questions provide children with physical space to draw models to represent their thinking and model the question. You may want to extend the question by asking children to design their own questions linked to this problem, for example, 'Can you find different ways of working out how many metres of cloth there are?'.

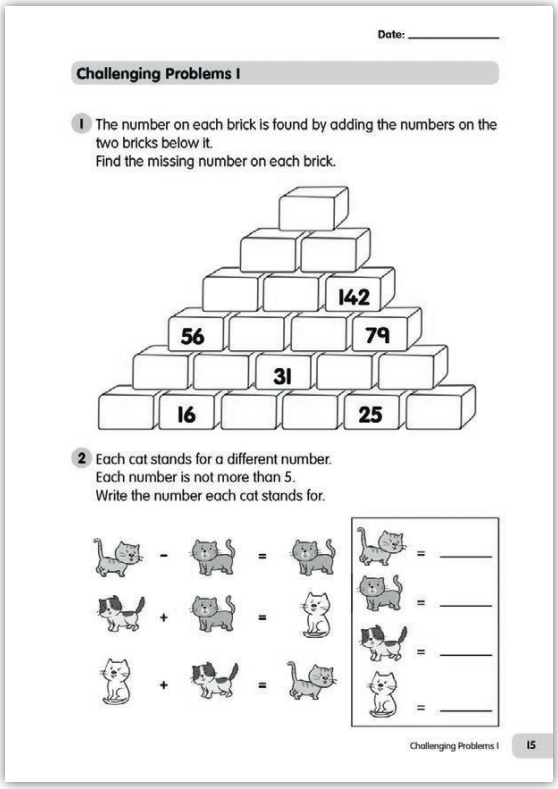
Challenging practice

Although your quick graspers will be working on the same area of mathematics as the rest of the class, you will want to know how to keep them enthusiastic, challenged and engaged. It is important not to accelerate children through the material as a means of challenging quick graspers, as grasping a concept quickly doesn't always mean that it is understood deeply or secure for the future. The *Inspire Maths* approach challenges quick graspers to deepen their understanding, rather than moving them on too quickly. The many opportunities for challenge include: 'Challenging Practice' and 'Put On Your Thinking Caps!' sections; challenging problems throughout the Pupil Textbooks; Assessment Book questions; and teacher questioning.

Consider whether your quick graspers can represent the problem you have given them in a variety of ways, using different types of concrete apparatus. Think about asking questions to encourage children to identify patterns and structures, such as, 'Can you explain how you worked it out?', 'How could you do it differently?', 'How could you check your answer?', 'Can you show me using different apparatus?', 'Can you make up a question to go with this number sentence?'.

There are lots of open-ended and challenging questions in the *Inspire Maths* Practice Books and Assessment Books to use as a springboard for deeper questioning, for example, 'Can you write some rules and tips for solving these sorts of problems?', 'If you can change the position of brick 25 but all the other bricks (16, 31, 56, 79 and 142) remain in the same place, can you still build the wall without using numbers below zero?', 'Where should we position brick 25 to give the largest possible number in the very top brick?'. I

I



Date: _____

Challenging Problems I

1 The number on each brick is found by adding the numbers on the two bricks below it.
Find the missing number on each brick.

142
56
79
31
16
25

2 Each cat stands for a different number.
Each number is not more than 5.
Write the number each cat stands for.

Challenging Problems I 15

***Inspire Maths* Assessment Book 2, page 15**

Struggling learners

You may have individual children in your class who reading challenging. Your use of words and concepts in your teaching can support children with their reading of the Pupil Textbook. Indeed, some schools have reported that *Inspire Maths* supports their reading progress. If children struggle with reading you could pre-read the page to children so that they are not encountering unfamiliar words in the lesson, or consider pairing struggling children with fluent readers to support them.

Prepare by looking in the Teacher's Guide at the 'Key Concepts' and words children will be using. You will also find a word list on *Inspire Maths Online*. Pre-teaching these words and phrases, for example by using flashcards, will help children who find reading more challenging.

Younger children will also need direct teaching to physically use the Pupil Textbook, for example, locating particular pages. Children usually pick this up amazingly quickly and enjoy using their Pupil Textbooks. If you have a visualiser, you can use this to show children the page they are looking for and to explain the structure of the Pupil Textbook, for example, contents page, page numbers, colours and characters. You will find further support on *Inspire Maths Online* for introducing children to the *Inspire Maths* Pupil Textbooks and Practice Books.

There will always be children who struggle to understand a particular concept, and it is our responsibility to recognise and support these children in their learning journey. Assessment throughout the teaching pathway ensures that children can receive rapid, appropriate intervention when they need it, and before they fall behind. Same day intervention is now seen to be an effective way to support struggling learners' understanding and fill in gaps. Irrespective of ability, all children should be part of your direct teaching, and will be working on the same topic. You will be able to address their different needs through your questioning and the use of manipulatives you encourage them to use. Differentiation is a challenge for all teachers and we recognise that traditional methods have put a limit on children's learning. We need to aim for effective differentiation and challenge for all children.

Introducing *Inspire Maths* in your school

If your school starts using *Inspire Maths* part-way through a school year, or if older children start using it for the first time, you will need to familiarise them with the Pupil Textbooks and the approach: using manipulatives; engaging in mathematical conversations; explaining their reasoning; and working as a whole class as well as with partners. You will need to ensure that children are ready to start working on the Pupil Textbooks, being mindful that Year 3 children may be working on *Inspire Maths* 2.

As with introducing any new programme, you will need to assess children's understanding of key topics, establishing and evidencing what they do and do not understand. It's important to ascertain your starting point carefully, to ensure that you don't miss anything out, or overlook misconceptions or gaps in children's understanding. You could use the 'End of Year Assessments' on *Inspire Maths Online* to help you do this, for example, use the Year I 'End of Year Assessment' to identify gaps in your Year 2 children's understanding.

Use the 'Transition Guides' and the 'Overview of Units' on *Inspire Maths Online* to identify what prior knowledge children need to access the learning. The 'Transition Guides' provide detailed information of where to look in earlier units. Remember that the *Inspire Maths* textbook numbering may not be the same as school year groups. You might need to use *Inspire Maths* 2 with your Year 3 children, and that's fine.

Some schools implementing *Inspire Maths* have restructured their curriculum by splitting the maths lesson into two daily sessions. Direct teaching and guided practice generally take place in the first session, with structured intervention in the second. Time between the two gives teachers the opportunity to consider how they will manage the second session. In these schools, the second session generally comprises three elements: further support and practice for struggling learners; support and challenge for consolidation and challenging questions; and practice for greater depth.

> The *Inspire Maths* programme has given me the confidence and the staff the confidence to make the best judgement that we can for our children so they develop the love of learning for mathematics. That confidence is going to take them forward to make sure that they have the very best start at Primary school.
>
> Jackie Savage, Outwood Primary Academy Lofthouse Gate

In the next section you will be able to read how *Inspire Maths* meets age-related expectations in the National Curriculum.

How does *Inspire Maths* relate to the National Curriculum?

Introduction

Inspire Maths is the UK edition of the Singaporean textbook programme *My Pals are Here!*, used by Singapore children since 2001 and currently adopted by 80% of Singapore schools. *My Pals are Here!* follows the Singapore curriculum, a spiral curriculum that continually builds and consolidates knowledge to provide deep understanding. The spiral curriculum and progression of concepts within *My Pals are Here!* has been trialled and revised extensively over the last 17 years, and the results speak for themselves. Singapore schools consistently rank at the top of international performance studies, including the Trends in International Mathematics and Science Study (TIMSS 2015) and the Programme for International Student Assessment (PISA 2015).[1] The effects of the *My Pals Are Here!* programme in raising standards of teaching and learning have also been felt in the UK, as shown in a significant independent study on the impact of *Inspire Maths* in UK schools,[2] as well as through the rise of Advocate Schools across the UK who report on how their teaching and learning has been transformed.[3] The continued success of the Singapore curriculum, as well as the extensive content-development process behind *My Pals are Here!*, demonstrate why *Inspire Maths* faithfully maintains the structure and progression of the original Singapore *My Pals are Here!* programme.

Maintaining the conceptual progression and development of topics in *Inspire Maths* is also important in light of their academic foundations. The *Inspire Maths* programme is firmly underpinned by the work of internationally-renowned educationalists, as detailed in the **Pace, progression and fidelity** section of this Guide. Of particular note is Skemp's theory that learning mathematics by relating ideas to each other (relational understanding) is more meaningful, and therefore more effective, than memorising facts and procedures (instrumental learning).[4] Skemp's ideas about relational understanding are central to the organisation of the units in *Inspire Maths*, which is designed to help children make connections across topics and thus deepen their conceptual understanding. The integrity of progression in *Inspire Maths*, which is not only research-based but proven to work in practice, is therefore essential to retain.

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1 http://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf

2 Hall J., Lindorff A. and Sammons P., Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England; Findings from a Mixed-Method Randomised Control Trial. (Oxford: Department of Education, University of Oxford, 2016): https://ore.exeter.ac.uk/repository/handle/10871/24265

2 For more information, see **'Proof of impact and research base'** pp. 10–17.

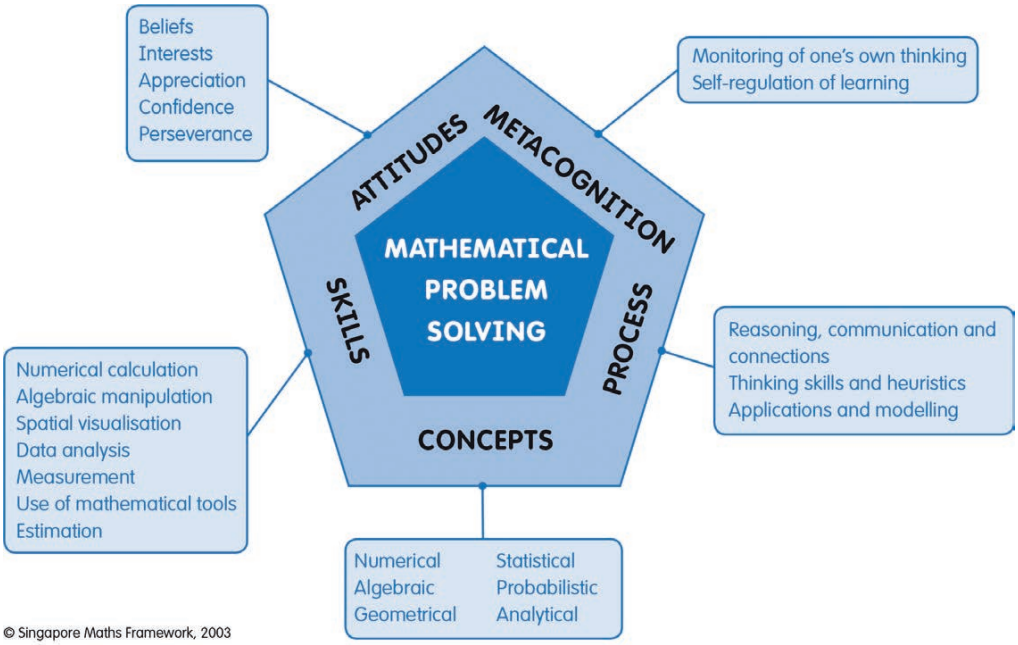
2 Skemp, Richard R., Relational Understanding and Instrumental Understanding (Warwick: Department of Education, University of Warwick, 1976): https://www.atm.org.uk/write/MediaUploads/Resources/Richard_Skemp.pdf

As we have discussed, *Inspire Maths* follows the Singapore curriculum as developed in the *My Pals are Here!* programme. That said, there are many similarities between the Singapore curriculum and the 2014 'National curriculum in England: mathematics programmes of study'. Firstly, the 2014 National Curriculum is fundamentally based on the curriculum of countries such as Singapore, as detailed by the NCETM:

> *"The content and principles underpinning the 2014 mathematics curriculum reflect those found in high performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China."*[5]

A key aspect of this influence is reflected in the adoption of a mastery approach to learning maths. The 2014 National Curriculum in England, as in Singapore, is a mastery curriculum. A mastery curriculum is designed in relatively small sequenced steps, which should each be mastered before children move to the next step. In addition, the introduction to the National Curriculum states: "Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas."[6] This acknowledges the ideas of educationalists such as Skemp which, as we have seen, are a fundamental underpinning of *My Pals are Here!* and consequently of *Inspire Maths*.

Furthermore, the 2014 National Curriculum aims for all children to be mathematically fluent, to be able to reason and to solve problems. These aims are reflected in the *Inspire Maths* core principles, encouraging children's 'confidence', 'reasoning', 'thinking skills' and 'problem solving', as shown in the diagram below.



The principles that underpin *Inspire Maths*

As illustrated, both the Singapore and English national curricula are rooted in the same core principles, making the *Inspire Maths* programme a trusted and proven resource to improve teaching and learning in the UK classroom.

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5 NCETM, Mastery approaches to mathematics and the new National Curriculum, Oct 2014: https://www.ncetm.org.uk/public/files/19990433/Developing_mastery_in_mathematics_october_2014.pdf

6 Department for Education, National curriculum in England: mathematics programmes of study (2014): https://www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study

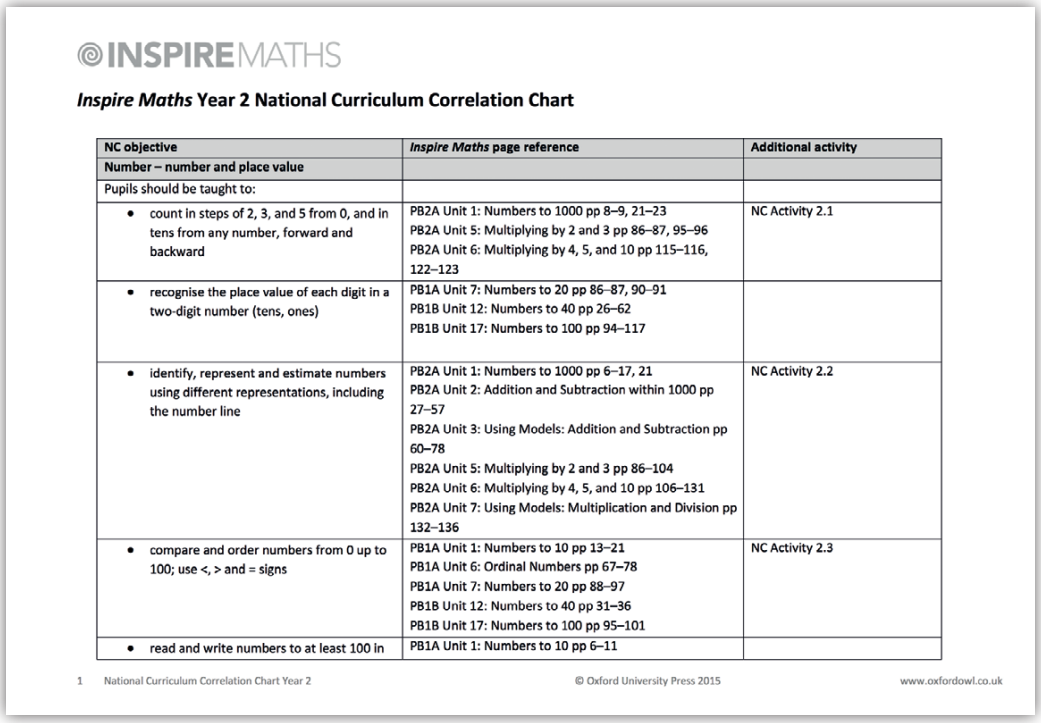
As *Inspire Maths* follows the cumulative, spiral approach of the Singapore curriculum, concepts and skills may be introduced in a different order to that of the 2014 National Curriculum in England. The progression of the units in *Inspire Maths* textbooks enables children to access content in the order that has proven to be successful over decades in Singapore. Equally, the numbering of *Inspire Maths* textbooks is not directly related to UK school year groups or National Curriculum coverage; *Inspire Maths* is structured by stage rather than by age. For example, it is not necessary to cover all the content in *Inspire Maths* 2 in Year 2. Children can continue working on *Inspire Maths* 2 in Year 3, as it is important that all children have a secure and deep understanding before moving on to the next stage. This is outlined further in the **Pace, progression and fidelity** section of this Guide.

Whilst there are differences in the ordering of topics between the Singapore and English national curricula, in following the *Inspire Maths* programme you can be confident that all relevant curriculum objectives will be covered by the end of each Key Stage. There is plenty of support and guidance on *Inspire Maths Online* (www.oxfordowl.co.uk) that will help you ensure you have met the requirements of the 2014 National Curriculum, and this support is outlined on the following pages.

Supporting resources

National Curriculum Correlation Charts

There are detailed correlation charts provided on *Inspire Maths Online* that show where the National Curriculum concepts for each year group are taught and practised in *Inspire Maths*, including references to the specific units and sections in the Pupil Textbooks. These are not intended as an alternative teaching sequence, but instead to reassure schools that all National Curriculum objectives are met within the *Inspire Maths* programme and demonstrate where they can be found. You will also find correlation charts on *Inspire Maths Online* to show how Inspire Maths can be mapped against the Curriculum for Wales.



INSPIRE MATHS

***Inspire Maths* Year 2 National Curriculum Correlation Chart**

NC objective	*Inspire Maths* page reference	Additional activity
Number – number and place value		
Pupils should be taught to:		
• count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward	PB2A Unit 1: Numbers to 1000 pp 8–9, 21–23 PB2A Unit 5: Multiplying by 2 and 3 pp 86–87, 95–96 PB2A Unit 6: Multiplying by 4, 5, and 10 pp 115–116, 122–123	NC Activity 2.1
• recognise the place value of each digit in a two-digit number (tens, ones)	PB1A Unit 7: Numbers to 20 pp 86–87, 90–91 PB1B Unit 12: Numbers to 40 pp 26–62 PB1B Unit 17: Numbers to 100 pp 94–117	
• identify, represent and estimate numbers using different representations, including the number line	PB2A Unit 1: Numbers to 1000 pp 6–17, 21 PB2A Unit 2: Addition and Subtraction within 1000 pp 27–57 PB2A Unit 3: Using Models: Addition and Subtraction pp 60–78 PB2A Unit 5: Multiplying by 2 and 3 pp 86–104 PB2A Unit 6: Multiplying by 4, 5, and 10 pp 106–131 PB2A Unit 7: Using Models: Multiplication and Division pp 132–136	NC Activity 2.2
• compare and order numbers from 0 up to 100; use <, > and = signs	PB1A Unit 1: Numbers to 10 pp 13–21 PB1A Unit 6: Ordinal Numbers pp 67–78 PB1A Unit 7: Numbers to 20 pp 88–97 PB1B Unit 12: Numbers to 40 pp 31–36 PB1B Unit 17: Numbers to 100 pp 95–101	NC Activity 2.3
• read and write numbers to at least 100 in	PB1A Unit 1: Numbers to 10 pp 6–11	

1 National Curriculum Correlation Chart Year 2 © Oxford University Press 2015 www.oxfordowl.co.uk

***Inspire Maths Online:* Year 2 National Curriculum Correlation**

The National Curriculum Correlation Charts also indicate where there are additional activities online to support full curriculum coverage. These are listed in the 'Additional activity' column shown on the preceding page.

Additional activities

The additional activities on *Inspire Maths Online* are designed to be used alongside the *Inspire Maths* Pupil Textbooks to ensure full coverage of the National Curriculum. In an instance where a National Curriculum objective is not covered within the *Inspire Maths* textbooks, it is always covered within the additional activities online. The additional activities can be integrated into an *Inspire Maths* teaching sequence at the beginning or end of a lesson, introduced through a daily 'Maths meeting' or taught through other areas of the curriculum such as Science, P.E. or Art.

Key Stage expectations

There is some content within *Inspire Maths* 2 that goes beyond Key Stage I, as well as some content within *Inspire Maths* 6 that goes beyond Key Stage 2. While the *Inspire Maths* programme is aspirational, there is no expectation that you teach beyond the National Curriculum expectations for your Key Stage, unless you are confident that the necessary Key Stage content has been consolidated and children are secure with deep conceptual understanding. As well as having a secure conceptual underpinning for successful progress through the curriculum, children also need to be developmentally ready. This is particularly crucial in relation to successful transition from concrete operational thinking to more formal and abstract mathematics. However, if children have secure foundations, deep understanding and guided support, they can often approach some of this content with great success. Bar models are also widely used in *Inspire Maths* to help children visualise, reason, problem solve and access more challenging problems. There are detailed charts at the end of *Getting Started Guide* 2 and 6 that can help you identify the National Curriculum Key Stage objectives that each *Inspire Maths* unit maps onto.

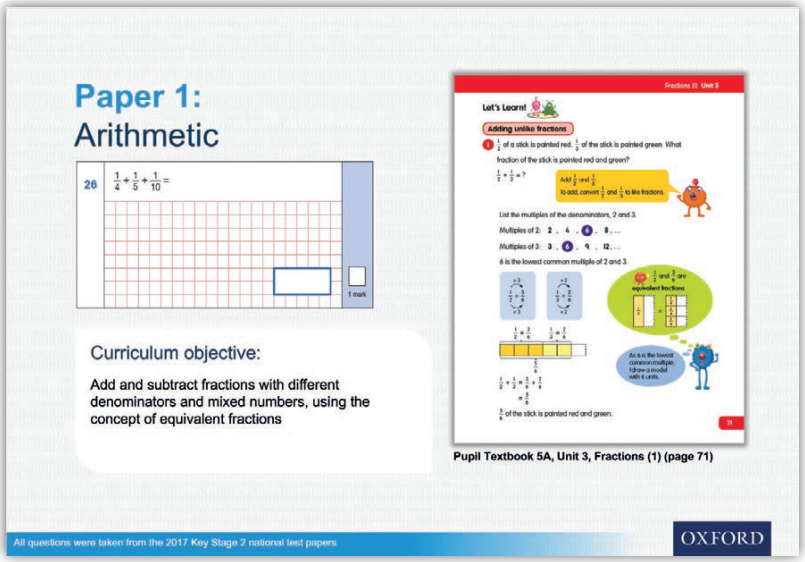
Assessment support and national tests

We recommend that children's progress is tracked through the *Inspire Maths* resources, including the assessment books, which map onto the cumulative, spiral curriculum adhered to by the *Inspire Maths* programme. However, schools may also wish to track children's progress against National Curriculum expectations. To support this, we have produced three additional assessments for each year group, which are designed to be used at the start, middle and end of the school year. These assessments, along with supporting mark schemes and tracking spreadsheets, can be found on *Inspire Maths Online*. They have been written in the style of the National Curriculum tests, and map onto National Curriculum objectives, so that you can be sure your children are on track and are well-prepared for their Key Stage I and 2 assessments.

Inspire Maths equips children with the deep conceptual understanding, fluency, reasoning and problem-solving skills they need to be successful in their national tests. On the following page you can see some examples of questions from the 2017 Key Stage 2 SATs papers,[7] alongside pages from the *Inspire Maths* Pupil Textbooks that illustrate how using *Inspire Maths* will help your children to prepare for their formal assessments.

7 The full Key stage 2 test papers: 2017 mathematics test materials are available here: https://www.gov.uk/government/publications/key-stage-2-tests-2017-mathematics-test-materials

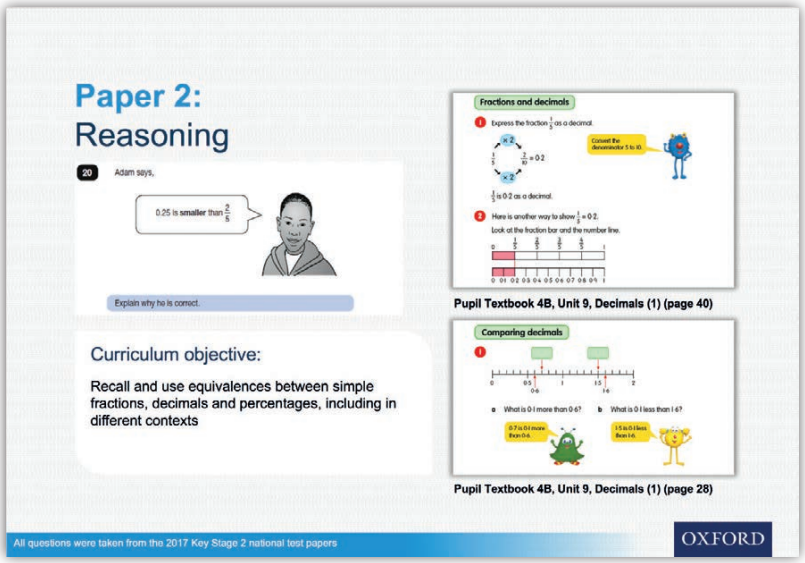
1



***Inspire Maths* and the Key Stage 2 national test papers**

In this example from the Key Stage 2 arithmetic paper, children are asked to add together three fractions with different denominators. This concept is taught in *Inspire Maths* 5A, where children learn how to add unlike fractions with the use of supporting models. 1

2



***Inspire Maths* and the Key Stage 2 national test papers**

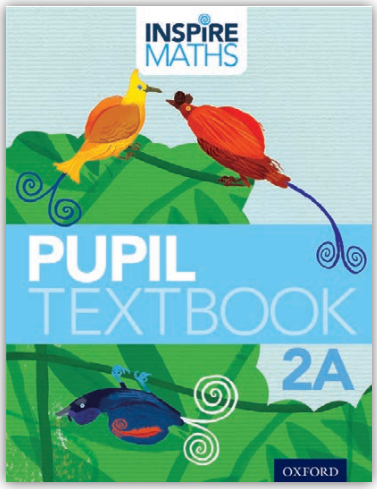
In this example from the Key Stage 2 reasoning paper, children are asked to compare a decimal to a fraction. This curriculum objective is taught in *Inspire Maths* 4B, in which children learn multiple methods to convert fractions to decimals and are then taught to compare decimals with the support of a number line. 2

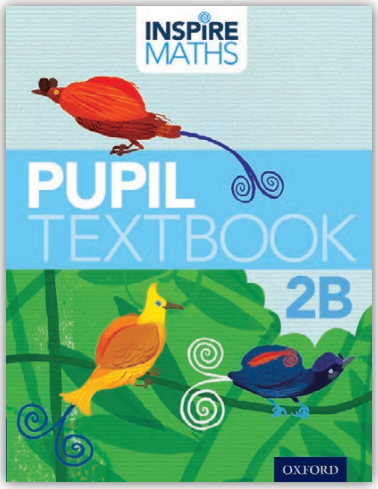
If you are teaching in Year 2 or in Year 6, the 'Year 2 and Year 6 National Curriculum tests (SATs) guidance' document on *Inspire Maths Online* provides alternative teaching sequences for these year groups to ensure your children meet the end of Key Stage National Curriculum objectives ahead of their national tests, whilst maintaining the proven progression of topics in *Inspire Maths*.

Using the supporting resources for *Inspire Maths* 2

On the following pages you will find examples of the supporting National Curriculum resources for *Inspire Maths* 2, including the unit progression, the additional activities and the assessment support to ensure full National Curriculum coverage for your year group.

Inspire Maths 2





We recommend starting *Inspire Maths* 2 when you are confident that your children have a secure and deep understanding of the mathematical concepts covered in *Inspire Maths* I. If your children are completely new to *Inspire Maths*, we recommend that you follow the transition guide for *Inspire Maths* 2 that can be found on *Inspire Maths Online*. The 7-week transition guide will support your children to access the required knowledge and skills prior to starting *Inspire Maths* 2.

The sequence of units in *Inspire Maths* should be followed in order to deliver the full aims of the Inspire Maths programme. However, as mentioned above, due to the timing of the national tests, you may choose to follow an alternative teaching sequence set out in the 'Year 2 and Year 6 National Curriculum tests (SATs) guidance' document on *Inspire Maths Online*. These alternative teaching sequences focus on curriculum coverage in advance of the national tests whilst maintaining the order of units that build upon each other, to secure and deepen understanding before moving on. For example, it is recommended that you still teach Units I–7 on number and calculation in numerical order, while other groups of units are reorganised. The alternative teaching sequences for Years 2 and 6 ensure children are ready for their formal assessments whilst maintaining the careful progression of topics that is fundamental to *Inspire Maths*.

The following tables detail the unit progression from *Inspire Maths* Pupil Textbooks 2A and 2B and indicate where additional activities are available to support curriculum coverage. Similar information is available in the '*Inspire Maths* 2 National Curriculum Correlation' chart on *Inspire Maths Online*. There are 22 National Curriculum additional activities to ensure that children cover all of the content of the Key Stage I statutory programme of study. Several of the additional activities cover content from multiple units of work; in these cases, the activity has been listed against the final unit so that it consolidates all elements of children's previous learning.

Inspire Maths 2A • Practice Books 2A and 2B • Assessment Book 2		
Unit	**Title**	**Additional activities**
1	Numbers to 1000	NC Activity 2·2: Identify, represent and estimate numbers using different representations, including the number line NC Activity 2·3: Compare and order numbers from 0 up to 100; use <, > and = signs
2	Addition and Subtraction within 1000	
3	Using Models: Addition and Subtraction	NC Activity 2·4: Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot NC Activity 2·5: Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
4	Multiplication and Division	
5	Multiplying by 2 and 3	
6	Multiplying by 4, 5 and 10	NC Activity 2·1: Count in steps of 2, 3, 4 and 5 from 0, and in tens from any number, forward and backward NC Activity 2·6: Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
7	Using Models: Multiplication and Division	NC Activity 2·7: Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
8	Length	
9	Mass	

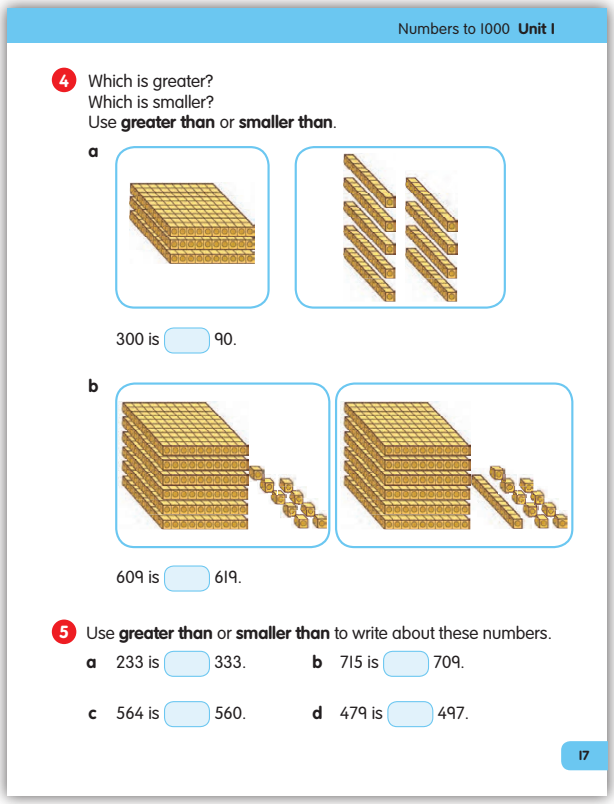
Inspire Maths 2B • Practice Books 2C and 2D • Assessment Book 2		
Unit	**Title**	**Additional activities**
10	Mental Calculations	
11	Money	NC Activity 2·12: Find different combinations of coins that equal the same amounts of money
12	Fractions	NC Activity 2·9: Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$
13	Time	NC Activity 2·13: Compare and sequence intervals of time NC Activity 2·14: Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times NC Activity 2·15: Know the number of minutes in an hour and the number of hours in a day

Inspire Maths 2B • Practice Books 2C and 2D • Assessment Book 2		
Unit	**Title**	**Additional activities**
14	Volume	NC Activity 2·8: Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{3}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity NC Activity 2·10: Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels NC Activity 2·11: Compare and order lengths, mass, volume/capacity and record the results using >, < and =
15	Graphs	NC Activity 2·21: Interpret and construct simple pictograms, tally charts, block diagrams and simple tables NC Activity 2·22: Ask and answer questions about totalling and comparing categorical data
16	Lines and Surfaces	
17	Shapes and Patterns	NC Activity 2·16: Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line NC Activity 2·17: Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces NC Activity 2·18: Identify 2-D shapes on the surface of 3-D shapes, (for example, a circle on a cylinder and a triangle on a pyramid) NC Activity 2·19: Compare and sort common 2-D and 3-D shapes and everyday objects NC Activity 2·20: Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)

Using additional activities and assessments in practice

When teaching *Inspire Maths* 2A Unit 1, 'Numbers to 1000', you can see from the unit progression table on the preceding page that there are two additional activities online to go with this unit. Let's take for example Activity 2·3, which addresses the National Curriculum objective 'Compare and order numbers from 0 up to 100; use <, > and = signs'. Guidance is given within the activity on where this can be incorporated into your teaching, in this case when you are working with children on pages 17–19.

The additional activity involves adapting the questions on Pupil Textbook page 17 to use the 'less than' and 'greater than' symbols, as well as 2-digit numbers. Several examples of adapted questions are provided for ease of use. You can then support children to work through the additional games within the activity, which reinforce these concepts. These include, for example, encouraging children to write a sentence about three different pan balances using =, and < or >. The Pupil Textbook page and additional activity are shown on the following page.



Numbers to 1000 **Unit 1**

4 Which is greater?
Which is smaller?
Use **greater than** or **smaller than**.

a

300 is ☐ 90.

b

609 is ☐ 619.

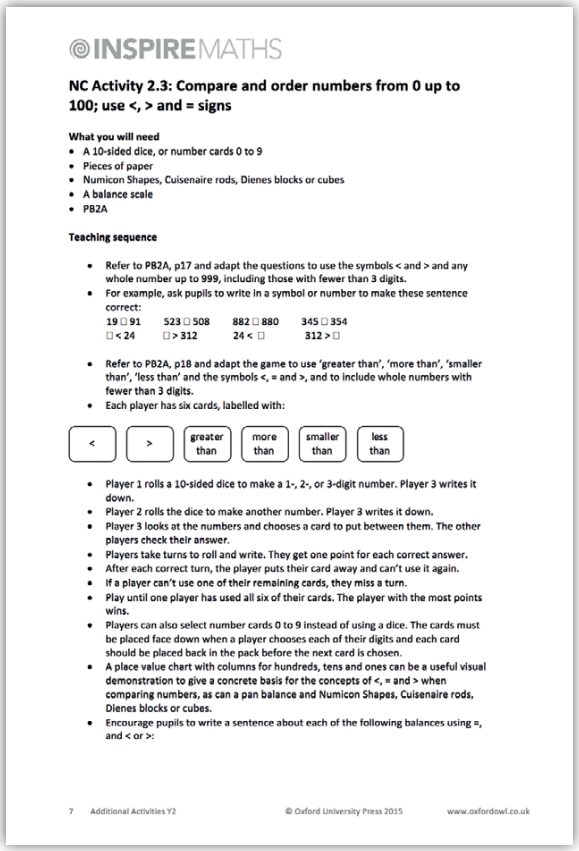
5 Use **greater than** or **smaller than** to write about these numbers.

a 233 is ☐ 333. **b** 715 is ☐ 709.

c 564 is ☐ 560. **d** 479 is ☐ 497.

17

***Inspire Maths* Pupil Textbook 2A, page 17**



INSPIREMATHS

NC Activity 2.3: Compare and order numbers from 0 up to 100; use <, > and = signs

What you will need

- A 10-sided dice, or number cards 0 to 9
- Pieces of paper
- Numicon Shapes, Cuisenaire rods, Dienes blocks or cubes
- A balance scale
- PB2A

Teaching sequence

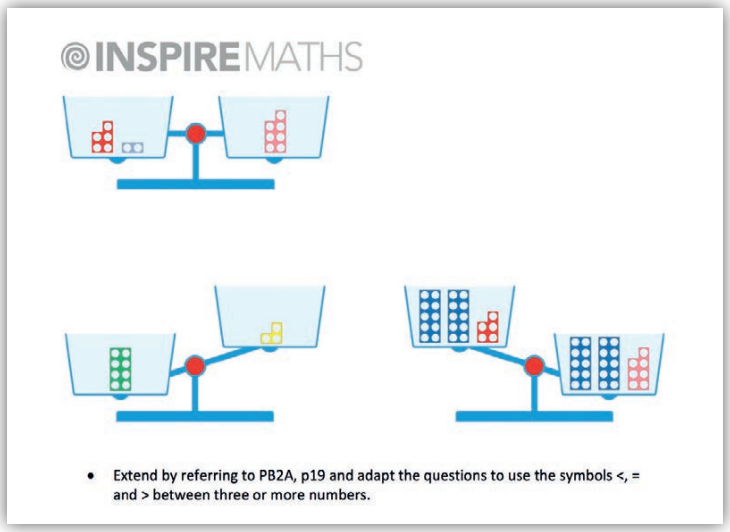
- Refer to PB2A, p17 and adapt the questions to use the symbols < and > and any whole number up to 999, including those with fewer than 3 digits.
- For example, ask pupils to write in a symbol or number to make these sentence correct:
  19 ☐ 91 523 ☐ 508 882 ☐ 880 345 ☐ 354
  ☐ < 24 ☐ > 312 24 < ☐ 312 > ☐
- Refer to PB2A, p18 and adapt the game to use 'greater than', 'more than', 'smaller than', 'less than' and the symbols <, = and >, and to include whole numbers with fewer than 3 digits.
- Each player has six cards, labelled with:

<	>	greater than	more than	smaller than	less than

- Player 1 rolls a 10-sided dice to make a 1-, 2-, or 3-digit number. Player 3 writes it down.
- Player 2 rolls the dice to make another number. Player 3 writes it down.
- Player 3 looks at the numbers and chooses a card to put between them. The other players check their answer.
- Players take turns to roll and write. They get one point for each correct answer.
- After each correct turn, the player puts their card away and can't use it again.
- If a player can't use one of their remaining cards, they miss a turn.
- Play until one player has used all six of their cards. The player with the most points wins.
- Players can also select number cards 0 to 9 instead of using a dice. The cards must be placed face down when a player chooses each of their digits and each card should be placed back in the pack before the next card is chosen.
- A place value chart with columns for hundreds, tens and ones can be a useful visual demonstration to give a concrete basis for the concepts of <, = and > when comparing numbers, as can a pan balance and Numicon Shapes, Cuisenaire rods, Dienes blocks or cubes.
- Encourage pupils to write a sentence about each of the following balances using =, and < or >:

7 Additional Activities Y2 © Oxford University Press 2015 www.oxfordowl.co.uk

***Inspire Maths Online:* Year 2 Additional Activities, page 7**



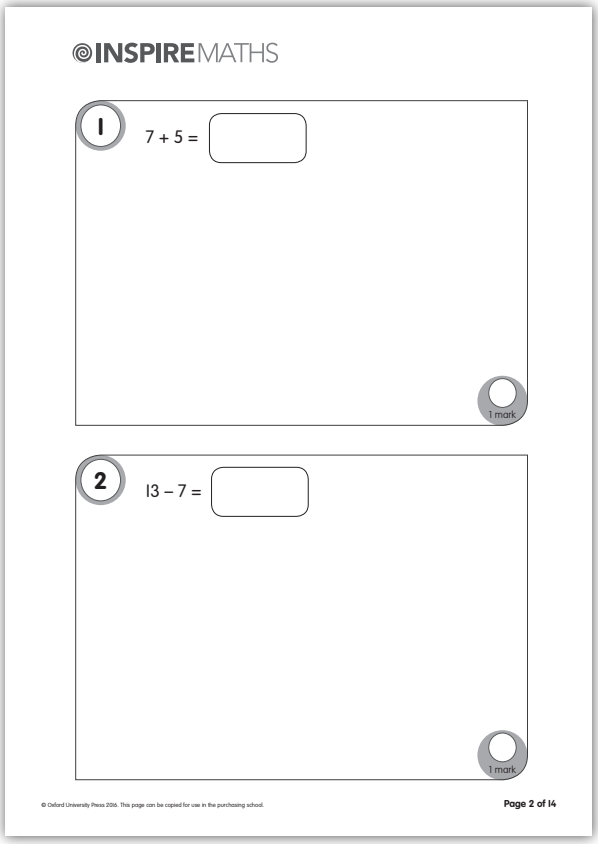
INSPIREMATHS

- Extend by referring to PB2A, p19 and adapt the questions to use the symbols <, = and > between three or more numbers.

***Inspire Maths Online:* Year 2 Additional Activities, page 8**

You can now be confident that children have accessed this National Curriculum objective before you return to teaching the rest of Unit 1 in the Pupil Textbook, which will consolidate and deepen this understanding. As you progress through *Inspire Maths* 2, you can use the unit progression table on the preceding pages to see when to intertwine the other additional activities into your teaching.

Throughout the year, you can also use the Beginning, Middle and End of Year Assessments for Year 2 on *Inspire Maths Online*, and the accompanying mark books, to track children's progress against Year 2 National Curriculum objectives. We have provided both arithmetic and reasoning papers to ensure that children become familiar with the style of questions they will encounter in their national assessments.


INSPIRE MATHS

1 7 + 5 = ☐

1 mark

2 13 – 7 = ☐

1 mark

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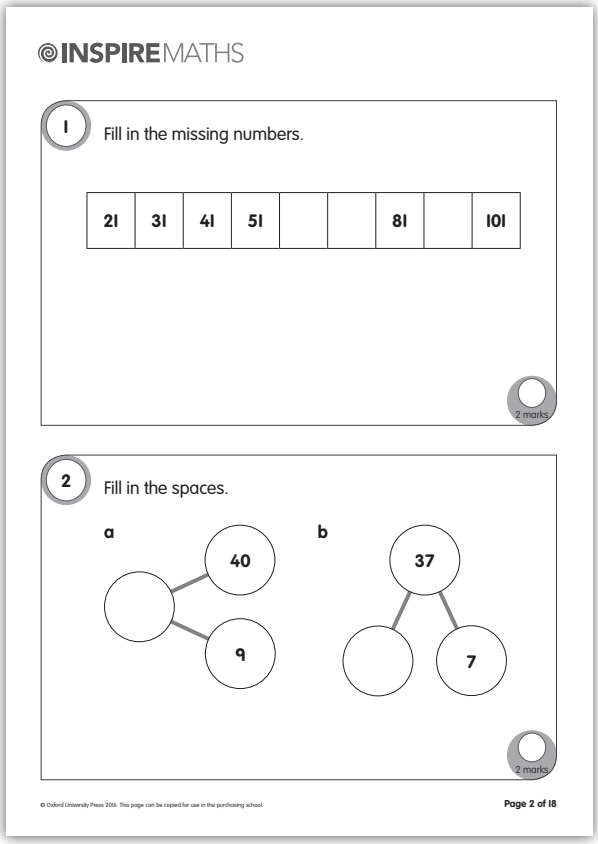
***Inspire Maths Online*: Beginning of Year Assessment Year 2 Paper 1: Arithmetic, page 2**


INSPIRE MATHS

1 Fill in the missing numbers.

21	31	41	51			81		101

2 marks

2 Fill in the spaces.

a

b

2 marks

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***Inspire Maths Online*: Beginning of Year Assessment Year 2 Paper 2: Reasoning, page 2**

Summary

Using the *Inspire Maths* textbook programme, children can be taught together and progress together. Singapore's experience and the experience of *Inspire Maths* schools in the UK show that high attainment and high equity are achievable when teaching is supported comprehensively by well-designed resources. Most importantly, following the programme fully will ensure that all National Curriculum objectives are covered. While the *Inspire Maths* curriculum is aspirational, there is no expectation that you teach beyond the National Curriculum expectations of Key Stage 2, unless you are completely confident that your children are secure with deep conceptual understanding and are ready for these next steps. *Inspire Maths* is a proven, high quality maths curriculum based on years of research and refinement and provides a secure foundation for our children to become confident learners, proficient problem solvers and capable mathematicians.

The next and final section in this Getting Started Guide details further support for successful implementation. This crucial support to improve the teaching and learning of mathematics in all situations is available on *Inspire Maths Online*.

Further support for successful implementation

Inspire Maths Online (www.oxfordowl.co.uk) contains a wealth of additional resources to help schools effectively implement the *Inspire Maths* programme. No two schools are the same, and so this bank of resources has been created to meet the needs of teaching *Inspire Maths* in your particular classroom. Some of the resources are introduced below. Lots more can be found on *Inspire Maths Online*.

Planning

Digital and editable copies of the medium- and long-term plans from your Teacher's Guides can be found online, detailing the progression of the units in the textbooks, plus a breakdown of the key concepts within each unit. These will help you to plan your own timetable, as well as giving an overview of what has been or will be taught in other year groups, so that you understand the overall progression of the programme. The long-term plans will offer suggestions of where you might use the tests, challenging problems and check-ups from each Assessment Book as well as the Practice Book reviews and revisions. The medium-term plans give you more detail on what you will be teaching, the learning objectives, the thinking skills and suggested resources required. In schools where there is more than one teacher per year group, the plans help to provide valuable consistency across teaching.

Teaching

Mixed-age classes

Adopting a mastery approach in a mixed-age class is a challenge faced by many teachers, especially those in smaller schools. 'Planning for a Mixed-Age Class using *Inspire Maths*' on *Inspire Maths Online* comprises practical considerations, long-term planning support, sample weekly plans and an editable weekly planning template to help teachers adapt their teaching for more than one year group. There are various options open to you when using *Inspire Maths* in a mixed-age class; for example, you may ask a Teaching Assistant to take one of the year groups while you take the other, or you may teach the same lesson to your whole class, with the older children working in greater depth. Most importantly, the plans suggest how to order the units in the *Inspire Maths* books to maintain the spiral progression while keeping similar areas of mathematics together for consistency of teaching and management of concrete resources.

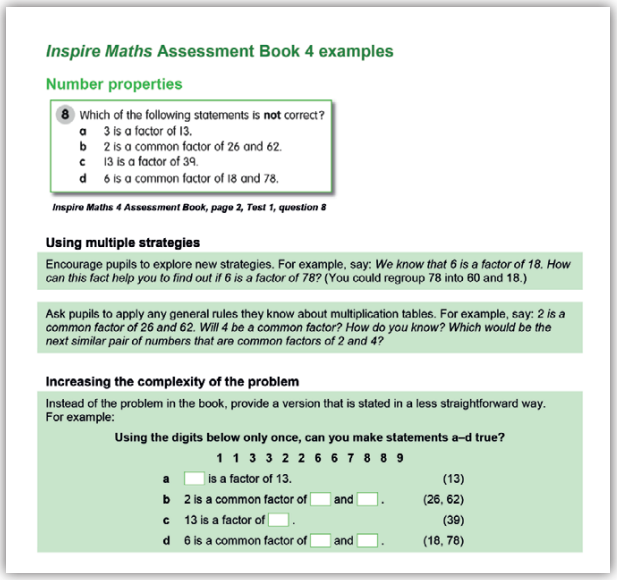
To see this in practice, the 'Managing Mixed-Age Classes' video and 'Teaching *Inspire Maths* in Mixed-Age Classes' case study show how teachers at St Mark's C.E. Primary School successfully teach mixed-age classes using the *Inspire Maths* programme.

Mixed-ability classes

The mastery approach requires all children to be working on the same concept in the lesson. *Inspire Maths* supports schools by providing resources to teach concepts at a variety of depths, allowing teachers to cater for the range of different abilities in their classroom. A sample of these tools is outlined below.

Quick graspers

The *Inspire Maths* Assessment Books are a great resource for formative and summative assessment. 'Getting the most out of the *Inspire Maths* Assessment Books' provides teachers with guidance on how to extend these assessment questions to provide greater depth and challenge in the classroom, including 30 examples across all six *Inspire Maths* Assessment Books. These examples give quick graspers the opportunity to reflect, discuss and investigate independently.



***Inspire Maths* Assessment Book 4 examples**

Number properties

8 Which of the following statements is **not** correct?
- **a** 3 is a factor of 13.
- **b** 2 is a common factor of 26 and 62.
- **c** 13 is a factor of 39.
- **d** 6 is a common factor of 18 and 78.

Inspire Maths 4 Assessment Book, page 2, Test 1, question 8

Using multiple strategies

Encourage pupils to explore new strategies. For example, say: *We know that 6 is a factor of 18. How can this fact help you to find out if 6 is a factor of 78?* (You could regroup 78 into 60 and 18.)

Ask pupils to apply any general rules they know about multiplication tables. For example, say: *2 is a common factor of 26 and 62. Will 4 be a common factor? How do you know? Which would be the next similar pair of numbers that are common factors of 2 and 4?*

Increasing the complexity of the problem

Instead of the problem in the book, provide a version that is stated in a less straightforward way. For example:

Using the digits below only once, can you make statements a–d true?

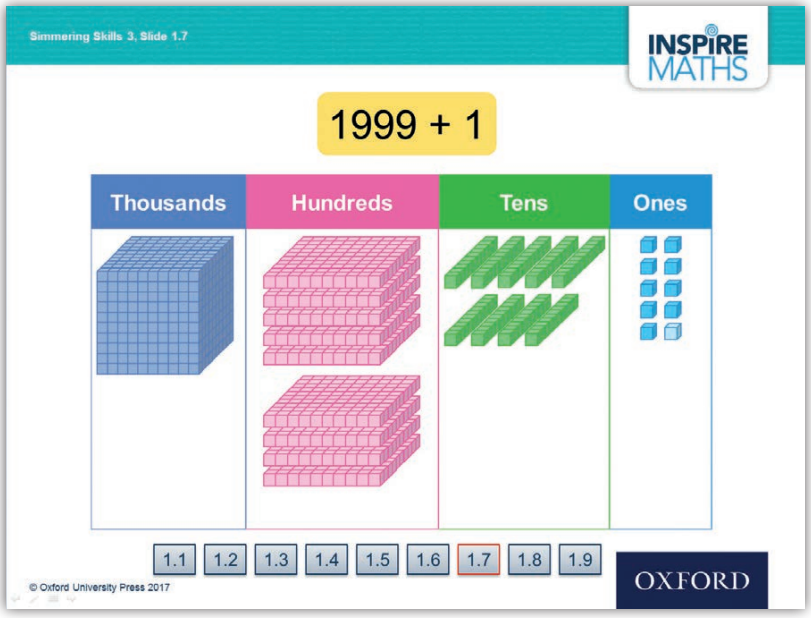
1 1 3 3 2 2 6 6 7 8 8 9

- **a** ☐ is a factor of 13. (13)
- **b** 2 is a common factor of ☐ and ☐. (26, 62)
- **c** 13 is a factor of ☐. (39)
- **d** 6 is a common factor of ☐ and ☐. (18, 78)

***Inspire Maths Online:* Getting the most out of the *Inspire Maths* Assessment Books, p.21**

Simmering Skills

'Simmering Skills' are designed to give teachers extra support in teaching essential number skills that underpin children's mathematical understanding and confidence and keep them bubbling away throughout the year. The 'Simmering Skills' activities comprise PowerPoint slides and accompanying teachers' notes to use in class, which together provide extra support for teaching key areas such as number, place value and fractions. They are also a useful tool for struggling learners, as earlier 'Simmering Skills' activities can be revisited to support gaps in knowledge and understanding.



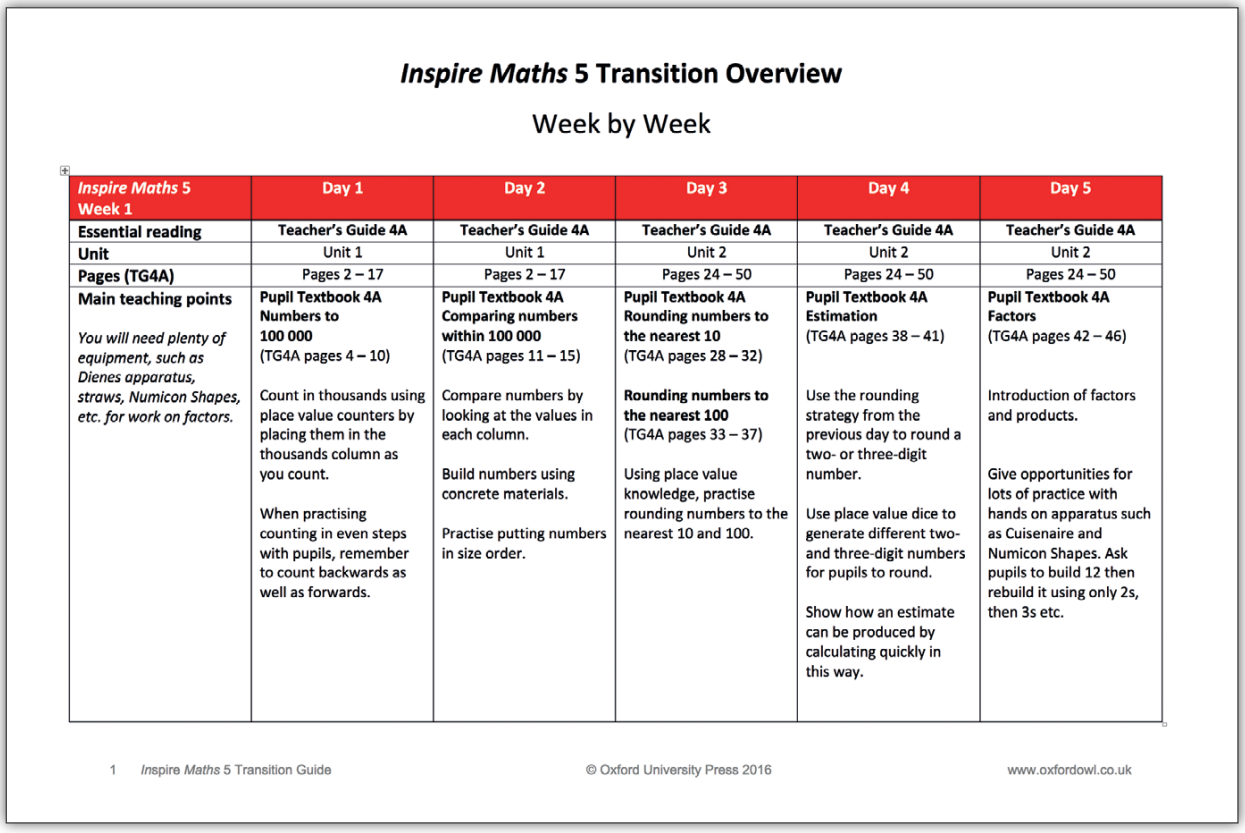
***Inspire Maths Online: Inspire Maths* 3 Simmering Skills, Activity 1, Slide 7**

The 'Case Study 2: Managing Mixed Ability Classes' video and accompanying teacher handout shows how teachers at Hayfield Lane Primary School cater for their mixed-ability classes using the *Inspire Maths* programme.

> *Inspire Maths* supports teaching in mixed-ability groups because it enables children to have those mathematical conversations, develop that mathematical language that we know is a key part of learning; it helps them to clarify their thinking and extend their learning.
>
> Liz Ryland, Hayfield Lane Primary School

Implementation in later years

The 'Transition Guides' are designed for teachers of classes from Years 2 to 5 who are new to *Inspire Maths*, to use in the first seven weeks of the academic year. For example, as a teacher introducing *Inspire Maths* 2 to your class for the first time, you will need to teach essential content from *Inspire Maths* Textbook IA and IB so that children have the required knowledge and skills to access the content in *Inspire Maths* 2. The seven-week transition content, plus the content within *Inspire Maths* 2A and 2B, can all be completed in one academic year.



***Inspire Maths* 5 Transition Overview**

Week by Week

Inspire Maths 5 Week 1	Day 1	Day 2	Day 3	Day 4	Day 5
Essential reading	**Teacher's Guide 4A**	**Teacher's Guide 4A**	**Teacher's Guide 4A**	**Teacher's Guide 4A**	**Teacher's Guide 4A**
Unit	Unit 1	Unit 1	Unit 2	Unit 2	Unit 2
Pages (TG4A)	Pages 2 – 17	Pages 2 – 17	Pages 24 – 50	Pages 24 – 50	Pages 24 – 50
Main teaching points *You will need plenty of equipment, such as Dienes apparatus, straws, Numicon Shapes, etc. for work on factors.*	**Pupil Textbook 4A Numbers to 100 000** (TG4A pages 4 – 10) Count in thousands using place value counters by placing them in the thousands column as you count. When practising counting in even steps with pupils, remember to count backwards as well as forwards.	**Pupil Textbook 4A Comparing numbers within 100 000** (TG4A pages 11 – 15) Compare numbers by looking at the values in each column. Build numbers using concrete materials. Practise putting numbers in size order.	**Pupil Textbook 4A Rounding numbers to the nearest 10** (TG4A pages 28 – 32) **Rounding numbers to the nearest 100** (TG4A pages 33 – 37) Using place value knowledge, practise rounding numbers to the nearest 10 and 100.	**Pupil Textbook 4A Estimation** (TG4A pages 38 – 41) Use the rounding strategy from the previous day to round a two- or three-digit number. Use place value dice to generate different two- and three-digit numbers for pupils to round. Show how an estimate can be produced by calculating quickly in this way.	**Pupil Textbook 4A Factors** (TG4A pages 42 – 46) Introduction of factors and products. Give opportunities for lots of practice with hands on apparatus such as Cuisenaire and Numicon Shapes. Ask pupils to build 12 then rebuild it using only 2s, then 3s etc.

1 *Inspire Maths* 5 Transition Guide © Oxford University Press 2016 www.oxfordowl.co.uk

***Inspire Maths Online: Inspire Maths* 5 Transition Guide, p.4**

Assessment

The Beginning-, Middle- and End-of-Year 'Assessment Papers' on *Inspire Maths Online* can also be used to inform the transition plan for the next school year. For example, you could use the End-of-Year Assessment Papers for Year 2 at the end of the summer term of Year 2, to ascertain any topics that require initial teaching, re-teaching or consolidation, and to help planning for the transition to Year 3. Mark Schemes and Markbooks will support you with your assessments.

These online assessments can help you to measure children's progress against the requirements of the 'National curriculum in England: mathematics programmes of study'. The tests have been written to align with age-related expectations for each school year, and will help children become familiar with reading and answering SATs-style questions.

Professional development

There is a range of professional development videos, including our 'Recommendations for Implementation' video and teacher handout, on *Inspire Maths Online*.

We recommend five days of professional development that has been designed for you and your school, over the first year and beyond. This includes building confidence in teaching for mastery through detailed understanding of the Singapore approach, building subject knowledge, and advice and support from expert educational consultants on planning, reviewing and reflecting on implementation.

Videos

There are lots of videos available to support your teaching and pedagogy, including what a successful *Inspire Maths* lesson might look like in the classroom, teaching for mastery and frequently asked questions. There are also accompanying handouts which summarise the key points of the videos, and which can be used for reference or to support you when planning staff meetings or parents' information evenings.

***Inspire Maths Online* is updated regularly to respond to schools' requirements, so please do revisit the site for any additional support you may need when implementing and delivering the programme.**

Inspire Maths 2 and Key Stages 1 and 2 from the National Curriculum

This chart maps the content of the *Inspire Maths* 2 textbooks onto National Curriculum objectives for Key Stage 1 and Key Stage 2 and will ensure that you are fully equipped to prepare your children for SATs tests and transition into Key Stage 2. Where there is an overlap between Key Stage 1 and Key Stage 2 requirements, professional judgement should be used as to whether, and when, Key Stage 2 material should be taught. As well as having a secure conceptual underpinning for successful progress through the curriculum, children also need to be developmentally ready. This is particularly crucial in relation to successful transition from concrete operational thinking (mathematical knowledge and operations linked directly to concrete concepts and examples) to more formal and abstract mathematics. If children have secure foundations, deep understanding and guided support, they can often approach some of these questions with great success.

You may want to consider using one of the topics after SATs, for example, using vocabulary such as o'clock, am and pm and reading digital times, and use this as a transition piece of work for children moving into Key Stage 2.

A more detailed version of this chart is available on *Inspire Maths Online*.

NB. All page numbers in the table below relate to the Inspire Maths *Pupil Textbook specified in the Learning Objectives column (i.e. 2A or 2B).*

Unit 1: Numbers to 1000

Learning Objectives	National Curriculum Objectives
2A, pp 6 to 26 **(1) Counting** • recognise concrete representations of numbers (100 to 1000), read and write their corresponding numbers and number words • recognise, read and write numbers (100 to 1000) and their corresponding number words (one hundred to one thousand) • count within 1000 by making hundreds and tens first • use the strategies of counting in ones, tens and hundreds to count to 1000 • recognise and interpret sentences associated with tens and ones **(2) Place value** • represent numbers as hundreds, tens and ones in a place value chart • show concrete representations in hundreds, tens and ones given a number up to 1000 • read and write numerals given a set of concrete representation and vice versa, with or without a place value chart **(3) Comparing numbers within 1000** • use the 'comparing the tens and then the ones' strategy to compare numbers up to 1000 • compare numbers up to 1000 using the terms 'greater than' and 'smaller than' with and without concrete representations • compare numbers up to 1000 using the terms 'greatest' and 'smallest' with and without concrete representations • compare numbers up to 1000 using the terms 'more than' and 'less than' with and without concrete representations **(4) Order and pattern** • compare two or more 3-digit numbers • identify the 'greatest number' and the 'smallest number' • compare a number with the previous number using the terms '1 more than', '1 less than', '10 more than', '10 less than', '100 more than' and '100 less than' • arrange numbers up to 1000 in an ascending or a descending order • recognise, read and write missing numbers in a given number sequence	*p 6, pp 8 to 17, pp 21 to 26* **Y1: Number – number and place value** • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • given a number, identify one more and one less **Y2: Number – number and place value** • identify, represent and estimate numbers using different representations, including the number line • recognise the place value of each digit in a two-digit number (tens, ones) • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • use place value and number facts to solve problems • compare and order numbers from 0 up to 100; use <, > and = signs *pp 6 to 23, p 25* **Y3: Number – number and place value** • count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number • recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • read and write numbers up to 1000 in numerals and in words • identify, represent and estimate numbers using different representations • compare and order numbers up to 1000 • solve number problems and practical problems involving these ideas

Unit 2: Addition and Subtraction within 1000

Learning Objectives	National Curriculum Objectives
2A, pp 27 to 59 **(1) Simple addition within 1000** • use place value charts with concrete representations to show addition of a 1-digit, 2-digit or 3-digit number to a 3-digit number without regrouping • add a 1-digit, 2-digit or 3-digit number to a 3-digit number without regrouping using both horizontal and column additions • solve simple addition word problems involving addition of a 1-digit, 2-digit or 3-digit number to a 3-digit number without regrouping **(2) Simple subtraction within 1000** • use place value charts and concrete representations to show subtraction of a 1-digit, 2-digit or 3-digit number from a 3-digit number • subtract a 1-digit, 2-digit or 3-digit number from a 3-digit number without regrouping using both horizontal and column subtraction • solve simple subtraction word problems involving subtraction of a 1-digit, 2-digit or 3-digit number from a 3-digit number without regrouping **(3) Addition with regrouping the ones** Pupils will be able to: • use place value charts and concrete representations to show addition of two 3-digit numbers with regrouping the ones • add a 3-digit number to another 3-digit number with regrouping the ones in both horizontal and column additions • solve simple addition word problems involving addition of a 3-digit number to another 3-digit number with regrouping the ones **(4) Addition with regrouping the tens** • use place value charts and concrete representations to show addition of a 2-digit number to a 3-digit number with regrouping the tens • add a 3-digit number to another 3-digit number with regrouping the tens in both horizontal and column additions • solve simple addition word problems involving addition of a 3-digit number to another 3-digit number with regrouping the tens **(5) Addition with regrouping the tens and ones** • use place value charts and concrete representations to show regrouping from ones to tens and from tens to hundreds in addition • add a 3-digit number to another 3-digit number with regrouping in ones and tens using both horizontal and column additions • solve simple addition word problems involving addition of a 3-digit number to another 3-digit number with regrouping the ones and tens **(6) Subtraction with regrouping the tens and ones** • use place value charts and concrete representations to show regrouping from tens to ones in subtraction • solve simple subtraction word problems involving subtraction of a 3-digit number from another 3-digit number with regrouping from tens to ones **(7) Subtraction with regrouping the hundreds and tens** • use place value charts and concrete representations to show regrouping from hundreds to tens in subtraction • subtract a 3-digit number from another 3-digit number with regrouping from hundreds to tens using both horizontal and column subtractions • solve simple subtraction word problems involving subtraction of a 3-digit number from another 3-digit number with regrouping from hundreds to tens **(8) Subtraction with regrouping the hundreds, tens and ones** • use place value charts and concrete representations to show regrouping from hundreds to tens and from tens to ones in subtraction • subtract a 3-digit number from another 3-digit number with regrouping from hundreds to tens and from tens to ones using both horizontal and column subtractions • solve simple subtraction word problems involving subtraction of a 3-digit number from another 3-digit number with regrouping from hundreds to tens and from tens to ones **(9) Subtraction with numbers that have zeros** • use place value charts and concrete representations to show regrouping from hundreds to tens and then from tens to ones in subtraction when the minuend is in hundreds • subtract a 2-digit or 3-digit number from another 3-digit number in hundreds with regrouping from hundreds to tens and then from tens to ones using both horizontal and column subtraction • solve simple subtraction word problems involving subtraction of a 2-digit or 3-digit number from a 3-digit number in hundreds with regrouping from hundreds to tens and then from tens to ones	*pp 27 to 59* **Y2: Number – number and place value** • identify, represent and estimate numbers using different representations, including the number line **Y2: Number – addition and subtraction** • solve problems with addition and subtraction: ➢ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ➢ applying their increasing knowledge of mental and written methods **Y2: Number – addition and subtraction – Notes and guidance (non-statutory)** • Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers *pp 27 to 59* **Y3: Number – number and place value** • recognise the place value of each digit in a three-digit number (hundreds, tens, ones) **Y3: Number – addition and subtraction** • add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Unit 3: Using Models: Addition and Subtraction

Learning Objectives	National Curriculum Objectives
2A, pp 60 to 78 **(1) Simple word problems (1)** • see the link between unit cube representation in 2D with bar diagrams in model drawings • interpret and represent the 'part-whole' concept in addition using models either with paper strips or by drawing bars • interpret and represent the 'part-whole' concept in subtraction using models either with paper strips or by drawing bars **(2) Simple word problems (2)** • interpret and represent the 'adding on' concept in addition using models either with paper strips or by drawing bars • interpret and represent the 'taking away' concept in subtraction using models either with paper strips or by drawing bars **(3) Simple word problems (3)** • interpret and represent the 'comparing' concept in addition or subtraction using models either with paper strips or by drawing bars. **(4) Two-step word problems** • interpret and represent 2-step problems in addition and subtraction using models either with paper strips or by drawing bars	*pp 60 to 78* **Y2: Number – number and place value** • identify, represent and estimate numbers using different representations, including the number line **Y2: Number – addition and subtraction** • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ➢ a two-digit number and ones ➢ a two-digit number and tens ➢ two two-digit numbers ➢ adding three one-digit numbers • solve problems with addition and subtraction: ➢ using concrete objects and pictorial representations, including those involving numbers, quantities and measures *pp 64 to 78* **Y3: Number – number and place value** • identify, represent and estimate numbers using different representations • solve number problems and practical problems involving these ideas **Y3: Number – addition and subtraction** • solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction **Y3: Measurement** • add and subtract amounts of money to give change, using both £ and p in practical contexts

Unit 4: Multiplication and Division

Learning Objectives	National Curriculum Objectives
2A, pp 79 to 85 **(1) How to multiply** • interpret the concept of multiplication as the number of groups by the number of items and as repeated addition • interpret the concept of multiplication as multiplying a set of items by number of times • calculate multiplication using repeated addition **(2) How to divide** • interpret the concept of division as sharing a number of items equally between a number of groups • interpret the concept of division as dividing a set of items into groups given a fixed set of items in each group • calculate division by relating to multiplication or repeated addition	*pp 79 to 85* **Y2: Number – multiplication and division** • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Unit 5: Multiplying by 2 and 3

Learning Objectives	National Curriculum Objectives
2A, pp 86 to 105 **(1) Multiplying by 2: skip-counting** • recall the 'multiplication' concept in groups of two • use the 'skip-count in twos' strategy to find the two times table facts • write the multiplication sentence from a word problem • commit the two times table facts to memory **(2) Multiplying by 2: using dot paper** • recall the 'multiplication' concept as multiplying • relate the multiples of 2 to dot paper that has two dots on each row • use dot paper as a strategy to find the two times table facts • use the 'commutative property' with dot paper as a strategy to find the two times table facts • use the 'connecting fact' strategy starting from 5 × 2 to find a more difficult fact • use the 'connecting fact' strategy starting from 10 × 2 to find a more difficult fact **(3) Multiplying by 3: skip-counting** • recall the 'multiplication' concept in groups of three • use the 'skip-count in threes' strategy to find the three times table facts • write the multiplication sentence from a word problem • commit the three times table facts to memory	*pp 86 to 105* **Y2: Number – number and place value** • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • identify, represent and estimate numbers using different representations, including the number line **Y2: Number – multiplication and division** • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

(4) Multiplying by 3: using dot paper • recall the 'multiplication' concept as multiplying • relate the multiples of 3 with dot paper that has three dots on each row • use dot paper as a strategy to find the three times table facts • use the 'commutative property' with dot paper as a strategy to find the three times table facts • use the 'connecting fact' strategy starting from 5 × 3 to find a more difficult fact • use the 'connecting fact' strategy starting from 10 × 3 to find a more difficult fact **(5) Division** • find the number of items in each equal group given a total number of items and number of groups (2 or 3 equal groups) • find the number of groups given the total number of items and the number of items in each group • recall multiplication facts to find division facts involving 3 as a dividend • write division number statements • solve simple division word problems involving finding the number of items or number of groups	• solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot *pp 95 to 105* **Y3: Number – multiplication and division** • recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Unit 6: Multiplying by 4, 5 and 10

Learning Objectives	National Curriculum Objectives
2A, pp 106 to 131 **(1) Multiplying by 4: skip-counting** • recall the 'multiplication' concept in groups of 4 or multiplying by 4 • use the 'skip-count in fours' strategy to find the four times table facts • write the multiplication sentence from a word problem • commit the four times table facts to memory **(2) Multiplying by 4: using dot paper** • relate the multiples of 4 to dot paper that has four dots on each row • use dot paper as a strategy to find the four times table facts • use the 'commutative property' with dot paper as a strategy to find the four times table facts • use the 'connecting fact' strategy starting from 5 × 4 to find a more difficult fact • use the 'connecting fact' strategy starting from 10 × 4 to find a more difficult fact **(3) Multiplying by 5: skip-counting** • recall the 'multiplication' concept in groups of 5 or multiplying by 5 • use the 'skip-count in fives' strategy to find the five times table facts • write the multiplication sentence from a word problem • commit the five times table facts to memory **(4) Multiplying by 5: using dot paper** • relate the multiples of 5 to dot paper that has five dots on each row • use dot paper as a strategy to find the five times table facts • use the 'commutative property' with dot paper as a strategy to find the five times table facts • use the 'connecting fact' strategy starting from 5 × 5 to find a more difficult fact • use the 'connecting fact' strategy starting from 10 × 5 to find a more difficult fact **(5) Multiplying by 10: skip-counting and using dot paper** • recall the 'multiplication' concept in groups of 10 or multiplying 10 • use the 'skip-count in tens' strategy to find the ten times table facts • write the multiplication sentence from a word problem • use dot paper as a strategy to find the ten times table facts • use the 'commutative property' with dot paper as a strategy to find the ten times table facts • use the 'short-cut' strategy starting from a simple fact to find a more complicated fact with '0' • commit the ten times table facts to memory **(6) Division** • recall division concepts in finding the number of groups or the number of items in each group • find division facts by recalling multiplication facts • relate division and multiplication facts • write division facts from given multiplication facts	*pp 106 to 130* **Y2: Number – number and place value** • identify, represent and estimate numbers using different representations, including the number line • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward **Y2: Number – multiplication and division** • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers *pp 106 to 114, pp 126 to 131* **Y3: Number – number and place value** • count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number **Y3: Number – multiplication and division** • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects • recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

Unit 7: Using Models: Multiplication and Division

Learning Objectives	National Curriculum Objectives
2A, pp 132 to 136 **(1) Multiplication** • interpret and represent the 'group and item' concept in multiplication using models either with paper strips or drawing bars **(2) Division** • interpret and represent the 'group and item' concept in division using models either with paper strips or drawing bars to find the number of items or groups	*pp 132 to 136* **Y2: Number – number and place value** • identify, represent and estimate numbers using different representations, including the number line **Y2: Number – multiplication and division** • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. *pp 132 to 136* **Y3: Number – multiplication and division** • recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Unit 8: Length

Learning Objectives	National Curriculum Objectives
2A, pp 137 to 154 **(1) Measuring in metres** • recognise the unit of measurement for length as metre (m) • estimate and measure 1 metre (1 m) lengths • name objects that are more than 1 m long, and objects that are less than 1 m long • estimate and measure the lengths of objects in metres **(2) Comparing lengths in metres** • compare the lengths of objects by measuring their lengths in metres • find the difference (how much more or less) in the lengths of objects by subtracting the lengths **(3) Measuring in centimetres** • recognise the unit of measurement centimetres (cm) and that it is used for measuring shorter lengths as compared to the metre • measure lengths of objects in centimetres (cm) using a ruler • use a string to measure the lengths of curves • draw lines given their lengths in centimetres using a ruler **(4) Comparing lengths in centimetres** • measure lengths of objects in cm using a ruler • compare the lengths of objects in cm and identify the longer and the shorter objects • find the length of an object when the object is not placed at the '0' mark • find the difference (how much more or less) in the lengths of objects by subtracting the lengths **(5) Addition and subtraction of length** • solve one- and two-step word problems by relating them to addition and subtraction concepts such as 'part-whole', 'adding on', 'taking away' and 'comparing' • draw models to help them solve word problems **(6) Multiplication and division of length** • solve one- and two-step word problems by relating them to multiplication and division concepts such as 'group and item' and 'multiplying' • draw models to help them solve word problems	*pp 137 to 140, pp 142 to 147* **Y2: Measurement** • choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order lengths, mass, volume/capacity and record the results using >, < and = *p 141, pp 147 to 154* **Y3: Measurement** • measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) **Y3: Number – multiplication and division** • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Unit 9: Mass

Learning Objectives	National Curriculum Objectives
2A, pp 155 to 175 **(1) Measuring in kilograms** • use the unit kilogram (kg) for measuring mass and have a sense of how heavy 1 kg is • tell how heavy 1 kg is by weighing an object, e.g. a bag of flour • read a scale which shows '1 kg', 'less than 1 kg' or 'more than 1 kg' • estimate the mass of an object and then check by measuring its mass using a weighing scale • find the mass of an object in kg using the balance with 1 kg weights • compare the masses of objects and tell which is heavier or lighter • solve problems by applying the 'balancing' concept **(2) Comparing masses in kilograms** • read a scale to determine the mass of objects • tell which object or person is heavier and how much heavier by weighing the objects separately • read a scale where the indicator does not point exactly to the numbers on the scale • use a kitchen scale to determine the order of the masses of two or three items **(3) Measuring in grams** • use the unit gram (g) for measuring mass and have a sense of how heavy 1 g is • tell how heavy 1 g is by weighing an item, e.g. a paper clip • read a scale which shows masses less than 500 g • find the mass of an object in grams using the balance with 1 g masses • determine the correct weighing scale for different items **(4) Comparing masses in grams** • measure and compare masses in g • identify which object is heavier/lighter/heaviest/lightest • state how much heavier an object is by subtracting • estimate the mass of an object and then verify it by using a weighing scale • solve problems by comparing the masses of combinations of items **(5) Addition and subtraction of mass** • find the total mass of two or more items (in kg) by adding the masses • find the difference in the masses by subtracting • solve problems and determine the operations used based on the addition and subtraction concepts • use models to help them solve problems • solve two-step word problems involving addition and subtraction of masses using the 'part-whole', 'comparison', 'adding on' and 'taking away' models **(6) Multiplication and division of mass** • solve problems involving multiplication concepts • use models to help them solve problems • solve one-step word problems involving multiplication • solve problems involving the division concept • read a word problem and decide if it is a multiplication or division calculation	*pp 155 to 168* **Y2: Measurement** • choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order lengths, mass, volume/capacity and record the results using >, < and = *pp 155 to 159, pp 167 to 175* **Y3: Measurement** • measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) **Y3: Number – multiplication and division** • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. **Y3: Number – addition and subtraction** • solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Unit 10: Mental Calculations

Learning Objectives	National Curriculum Objectives
2B, pp 6 to 18 **(1) Mental addition** • use number bonds for 10s to mentally add a 1-digit number to a 2-digit number within 100 without regrouping • use number bonds to mentally add a 1-digit number to a 3-digit number with or without regrouping the ones • use number bonds to mentally add a 3-digit number and tens with or without regrouping in tens • use number bonds to mentally add a 3-digit number and hundreds without regrouping in hundreds **(2) Mental subtraction** • use number bonds to mentally subtract a 1-digit number from a 2-digit number within 100 with or without regrouping • use number bonds to mentally subtract a 1-digit number from a 3-digit number within 1000 with or without regrouping the tens into ones • use number bonds to mentally subtract tens from a 3-digit number within 1000 with or without regrouping the hundreds into tens • use number bonds to mentally subtract hundreds from a 3-digit number without regrouping	*pp 6 to 7, p 13* **Y2: Number – addition and subtraction** • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ➢ a two-digit number and ones ➢ a two-digit number and tens ➢ two two-digit numbers ➢ adding three one-digit numbers *pp 8 to 12; pp 14 to 18* **Y3: Number – addition and subtraction** • add and subtract numbers mentally, including: ➢ a three-digit number and ones ➢ a three-digit number and tens ➢ a three-digit number and hundreds

Unit 11: Money

Learning Objectives	National Curriculum Objectives
2B, pp 19 to 31 **(1) Counting pounds and pence** • recognise different coins and notes and know the value of each • state the total value of a set of notes and coins • write amounts of money in numbers, given the amount written in words **(2) Changing pounds and pence** • convert pence to pounds • convert pence to pounds and pence • convert pounds to pence • convert pounds and pence to pence **(3) Comparing amounts of money** • write the amount of money in a place value chart in pounds and pence • use a strategy to compare the amounts of money by first comparing the pounds followed by the pence • state the greater/greatest or smaller/smallest amount of money using the 'comparing pounds and pence' strategy **(4) Word problems:** *Addition and subtraction of money* • solve one-step or two-step word problems in addition or subtraction involving 'part-whole', 'adding on', 'taking away' or 'comparing' concepts; in pounds only or in pence only • draw models to solve word problems in pounds only or in pence only *Multiplication and division of money* Pupils will be able to: • solve one-step word problems in multiplication and division involving 'group and item' and 'multiplying' concepts • draw models to solve word problems	*pp 19 to 31* **Y2: Measurement** • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • find different combinations of coins that equal the same amounts of money • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change

Unit 12: Fractions

Learning Objectives	National Curriculum Objectives
Pupil Textbook 2B, pp 32 to 59 **(1) Understanding fractions** • use shapes to represent one whole and fractions with denominators of up to 12 • write fractions with denominators of up to 12 from given shapes with equal divisions • identify whether a shape has been cut into equal fractional parts • read and write fractions in words • identify parts and whole from a given situation • write fractions to represent the parts of a whole from a given situation **(2) More fractions** • represent fractions using model drawings • represent a situation in terms of fractions and then model drawings • represent fractions using drawings of shapes **(3) Comparing and ordering fractions** • compare and order two or more fractions with the same denominator using rectangular strips or model drawings of the same size • compare and order two or more fractions with different denominators using rectangular strips or model drawings of the same size • order two or more fractions with or without the use of rectangular strips of the same size or model drawings **(4) Adding and subtracting like fractions** • add two or three fractions with the same denominator taken from a whole • subtract a fraction from another fraction with the same denominator taken from a whole • subtract two fractions with the same denominator from the same whole • conceptualise addition and subtraction of fractions by representing the subtraction with model drawings **(5) Solving word problems** • recall and apply 'part-whole' and 'adding on' concepts in addition of two fractions using model drawing to solve word problems • recall and apply 'part-whole' and 'taking away' concepts in subtraction of fractions using model drawing to solve word problems	*pp 32 to 37* **Y2: Number – fractions – Notes and guidance (non-statutory)** • Pupils use fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet 3/4 as the first example of a non-unit fraction. **Y2: Number – fractions** • recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity *pp 38 to 59* **Y3: Number – fractions** • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • compare and order unit fractions, and fractions with the same denominators • add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7] • recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • solve problems that involve all of the above

Unit I3: Time

Learning Objectives	National Curriculum Objectives
2B, pp 60 to 78 **(I) The minute hand** • recite the 5 times table and relate it to the clock's minute markings • recall and use the conversion: • 60 minutes = I h • tell the time as __ mins after __ o'clock • read and write the time in minutes to intervals of 5 minutes • name the numeral or draw the minute hand given the time in hours and minutes **(2) Reading and writing the time** • tell the time in hours and minutes by looking at the positions of the hour and minute hands • write the time in hours and minutes in numerals • draw the position of the hour hand or the minute hand given the time in numerals • make up stories about what they were doing at the times shown **(3) Learning a.m. and p.m.** • write times in a.m. or p.m. to differentiate between morning, afternoon and evening • choose a.m. or p.m. based on clues such as 'in the morning', 'afternoon', 'evening' or 'night' • arrange a sequence of events in order, beginning with the earliest **(4) Time taken in hours and minutes** • find the duration in terms of I hour or half an hour given start and end times • find the start time given the end time and duration of I hour or half an hour • find the end time given the start time and duration of I hour or half an hour	*pp 60 to 73* **Y2: Measurement** • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • know the number of minutes in an hour and the number of hours in a day • compare and sequence intervals of time *pp 60 to 78* **Y3: Measurement** • tell and write the time from an analogue clock, including using Roman numerals from I to XII, and I2-hour and 24-hour clocks • estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • compare durations of events [for example to calculate the time taken by particular events or tasks]

Unit I4: Volume

Learning Objectives	National Curriculum Objectives
2B, pp 79 to I0I **(I) Getting to know volume:** *Understanding volume* • understand and explain that the volume of a liquid is the amount of that liquid in a container • understand that the volume of water is conserved no matter which container is used to contain the water *Comparing volumes* • compare the volumes of liquids in identical containers by comparing the levels of liquid in the containers • compare levels of liquids in identical containers to determine which container has the most or least liquid • compare the volumes of water in identical containers and arrange them in ascending or descending order • compare the amounts of water in identical or non-identical containers by counting the number of non-standard units (glasses) that fill each container **(2) Measuring in litres** • state that the unit of measurement for volume is the litre (l) • know how much I litre of liquid is and give examples of containers that can contain I litre of liquid • compare a measuring cylinder with I litre of liquid with another cylinder with more/less liquid • estimate the number of litres of water a container can hold and then check by measuring with II containers • use a scale on a container to find the volume of water it contains in litres **(3) Addition and subtraction of volumes** • solve problems by relating the problems to addition and subtraction concepts such as 'part-whole', 'adding on', 'taking away' and 'comparing' • draw models to help solve one-step word problems • solve two-step word problems involving the use of addition and subtraction concepts • draw models to help solve two-step word problems **(4) Multiplication and division of volumes** • solve problems by relating them to multiplication and division concepts such as 'group and item' and 'multiplying' • draw 'part-whole' models to help solve one-step word problems	*pp 79 to 88, pp 92 to 93* **Y2: Measurement** • choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order lengths, mass, volume/capacity and record the results using >, < and = **Y2: Number – addition and subtraction** • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts *pp 89 to 94* **Y3: Measurement** • measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)

Unit I5: Graphs

Learning Objectives	National Curriculum Objectives
2B, pp 95 to 109 **(I) Reading picture graphs** • read and interpret picture graphs with scales in 1, 2, 3, 4, 5 or 10 • find the scale given the total number of items for a category and the number of units represented by each symbol • compare the differences between two or more types of items • find the sum of the number of items of two categories given in the picture graph • find the number of symbols to be drawn in the picture graph with sufficient information given **(2) Making picture graphs** • make picture graphs with scales in 1, 2, 3, 4, 5 or 10 • record items and make tables from information found in picture graphs • draw picture graphs with scales from the table, using appropriate scales for each picture graph • interpret information from picture graphs **(3) More graphs** • interpret graphs related to scale, make comparisons and find sums and differences • solve problems using picture graphs involving two variables	*pp 95 to 97, pp 102 to 108* **Y2: Statistics** • interpret and construct simple pictograms, tally charts, block diagrams and simple tables • ask and answer questions about totalling and comparing categorical data. • ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity *pp 98 to 101, p 109* **Y3: Statistics** • interpret and present data using bar charts, pictograms and tables • solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables

Unit I6: Lines and Surfaces

Learning Objectives	National Curriculum Objectives
2B, pp 110 to 119 **(I) Straight lines and curves** • identify and differentiate straight lines and curves • use a ruler and pencil to draw straight lines • use a pencil to draw curves • use 'finger-tracing' to feel and tell whether a line is a curve or a straight line • identify straight lines and curves in pictures and 3D shapes • draw pictures with only straight lines, pictures with only curves or pictures with straight lines and curves **(2) Flat surfaces** • differentiate between a flat surface and a curved surface by moving their hand over the surfaces • identify 3D objects that have flat surfaces • count the number of flat surfaces of a given set of geometrical shapes • find objects that have flat surfaces	*pp 110 to 119* **Y2: Geometry – properties of shapes** • identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line • identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces **Y2: Geometry – properties of shapes – Notes and guidance (non-statutory)** • Pupils draw lines and shapes using a straight edge

Unit I7: Shapes and Patterns

Learning Objectives	National Curriculum Objectives
2B, pp 120 to 136 **(I) 2D shapes** • recognise a semicircle as half a circle and a quarter circle as one quarter of a circle • recognise things with semicircular shapes and things with quarter circle shapes • recognise semicircles and quarter circles in composite shapes • make pictures using shapes including semicircles and quarter circles • make pictures from cut-out shapes • draw shapes • copy shapes onto square dotty paper • copy shapes onto squared paper **(2) 3D shapes** • recognise, identify and name the 3D shapes: cube, cuboid, cone and cylinder • identify and name the 3D shapes used in making a given model • make models using the 3D shapes **(3) Making patterns** • identify patterns using the attributes: size, shape, colour and orientation • identify shapes in repeating sequences • identify missing shapes from patterns • explain a pattern and continue the pattern • make simple repeating patterns using 1 or 2 attributes and explain how they made the pattern • make new patterns with the given basic shapes	*pp 120 to 136* **Y1: Geometry – properties of shapes** • recognise and name common 2-D and 3-D shapes, including: ➢ 2-D shapes [for example, rectangles (including squares), circles and triangles] ➢ 3-D shapes [for example, cuboids (including cubes), pyramids and spheres] **Y2: Geometry – properties of shapes** • identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line • compare and sort common 2-D and 3-D shapes and everyday objects **Y2: Geometry – properties of shapes – Notes and guidance (non-statutory)** • Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons **Y2: Geometry – position and direction** • order and arrange combinations of mathematical objects in patterns and sequences

Addendum

Contents

1 Executive summary to the case studies and report

Context and aims of this report

England's 2014 National Curriculum set higher expectations for maths outcomes, focusing on three clear aims:

1. become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
2. reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
3. can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions[1]

These aims reflected a growing focus on the approaches used to teach and learn maths in high-performing jurisdictions (HPJs), championed by policymakers and organisations like the National Centre for Excellence in the Teaching of Mathematics (NCETM). In 2015, Oxford University Press launched its whole-school mastery textbook programme, *Inspire Maths,* adapted from *My Pals are Here!,* the number one primary maths programme used by almost 100% of state primary schools in Singapore[2]. Singapore is a HPJ for maths achievement according to the Programme for International Student Assessment (PISA) surveys (globally ranked second in 2012 and first in 2015)[3]. A team of UK teachers adapted *Inspire Maths* so it could be used to deliver the English National Curriculum at the same time preserving the successful textbook approach, proven progression, and transformative mastery pedagogy of the Singapore original. Initial evidence of the practical success of *Inspire Maths* was shown in a detailed random control study by Oxford University's Department of Education into the use of *Inspire Maths* in Year 1[4]. This follow-up report shines a spotlight on five schools that have been teaching with *Inspire Maths* for several years, and uses case studies to explore in greater depth each school's experience of using the programme over a sustained period. It demonstrates – in the schools' own words – how they have used *Inspire Maths* to transform primary maths learning and outcomes for their children.

We asked schools to tell us:

1. the impact *Inspire Maths* has had on teaching and learning in mathematics
2. how *Inspire Maths* supports them in fulfilling the requirements of the National Curriculum
3. how *Inspire Maths* helps teachers to teach for mastery at a suitable pace, with clear progression for children working at all levels
4. the benefits of using *Inspire Maths*' high-quality textbooks for consistency of teaching, teacher confidence and workload

[1] Department for Education, 2013 'Mathematics programmes of study: key stages 1 and 2, National Curriculum in England'

[2] Fong, H.K. et al, 2001 *My Pals are Here!,* Singapore: Marshall Cavendish

[3] OECD, 2018 'PISA 2015 Results in Focus'

[4] Hall J., Lindorff A. and Sammons P., 2016 `Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England; Findings from a Mixed-Method Randomised Control Trial'. Department of Education, University of Oxford, independently examined and approved by the University of Southampton

Methodology of the case studies

In July 2018, five schools that had adopted *Inspire Maths* soon after its publication were identified. The schools were:

- St Thomas' C of E Primary School in Blackburn
- Fulwell Infant School Academy in Sunderland
- Barncroft Primary School in Hampshire
- Squirrel Hayes First School in Staffordshire
- Rawmarsh Thorogate School in Rotherham.

"It is our view of a perfect scheme… they've really considered every last detail."

"There isn't a child who now feels that they can't do maths."

Fulwell Infant School Academy, Sunderland

Independent researchers created a survey and interview script designed to let the schools provide evidence of how they have delivered the *Inspire Maths* programme, and the impact that they have seen on National Curriculum outcomes. All five schools completed the questionnaire and took part in a detailed telephone interview. Independent researchers then wrote up case study notes and the conclusions contained in this summary report.

The schools

The schools are in a variety of different circumstances. Two out of the five schools interviewed are located in areas of high deprivation, with a much higher percentage (43% and 47.9% respectively) of children attracting pupil premium than the national average (26.6%)[5]. One school, at 21.5%, is close to the national average. At one school, 63% of children have English as an additional language (EAL). All five schools had identified a need to raise their standards in maths and were attracted to mastery; which led them to adopt *Inspire Maths*.

The schools have seen their children's outcomes for maths transformed.

At Barncroft Primary School **47.9%** of children attract Pupil Premium.

Fulwell Infant School Academy
LA: Sunderland
Pupils on roll: 370
SEN: 1.9%
EAL: 3.3%
Pupil Premium: 7.9%
Years 1 and 2 using Inspire Maths.
Adopted in 2016

St Thomas' Church of England School
LA: Blackburn with Darwen
Pupils on roll: 477
SEN: 2.7%
EAL: 63.2%
Pupil Premium: 20.5%
Years 1 to 6 using Inspire Maths.
Adopted in 2016

Rawmarsh Thorogate School
LA: Rotherham
Pupils on roll: 205
SEN: 0%
EAL: 0.6%
Pupil Premium: 21.5%
Years 1 to 6 using Inspire Maths.
Adopted in 2016

Squirrel Hayes First School
LA: Staffordshire
Pupils on roll: 137
SEN: 37%
EAL: 0%
Pupil Premium: 43%
Years 1 to 4 using Inspire Maths.
Adopted in 2016

Barncroft Primary School
LA: Hampshire
Pupils on roll: 411
SEN: 22%
EAL: 0%
Pupil Premium: 47.9%
Years 1 to 4 using Inspire Maths.
Adopted in 2015 (at Key Stage 1)

[5] Department for Education, 2013 'Illustrative number of pupils eligible for the pupil premium in 2014 -15'

Improved outcomes in teaching and learning

All of the schools interviewed reported higher levels of attainment since implementing *Inspire Maths*. Teachers reported an increase of confidence in both staff and children. Staff across the schools interviewed have had the opportunity to completely reassess the way that they teach maths, extend their own understanding of the subject, and improve their teaching skills. All schools praised the professional development provided by OUP, explaining that it gave them the support and skills they needed to implement the programme successfully.

"It's revamped maths; like a breath of fresh air... it's not just the higher end pupils – it's everyone."

"The teachers have higher expectations... It's creating that mindset where everyone can achieve. The programme makes that possible because of how it's structured and scaffolded."

St Thomas' C of E Primary School, Blackburn

All five school received SATs scores well above the national average (NA).

Proportion of children working at ARE and Greater Depth (GD):

Squirrel Hayes Year 2 2016 57% → 2017 72% → 2018 95% (35% GD) = **+20%** NA

Fulwell Year 2 2017 89% (34% GD) → 2018 86% (34% GD) = **+11%** NA

Barncroft Year 2 2018 → 83% (40% GD) = **+8%** NA

Rawmarsh Thorogate Year 6 2015 53% → 2017 83% = **+8%** NA

St Thomas' C of E Year 6 2017 75% (10% GD) → 2018 95% (33% GD) = **+20%** NA

Based on 2017's national average, where 75% of children were meeting expectations, and 23% achieving greater depth (Department for Education, 2017 'National curriculum assessments at key stage 2 in England, 2017 (revised)')

Sequencing and the National Curriculum

To preserve the integrity and impact of the programme, *Inspire Maths* retains the original tried-and-tested Singapore progression. Support is provided in the UK programme so it can be used with England's National Curriculum Programme of Study. While different approaches are evident across the five schools, all use the support in the *Inspire Maths* teachers' materials, in particular the medium-term plans, to plan the order of topics and concepts. Several teachers describe how useful these were in the first year of implementation, and how with growing confidence both in their own delivery of the programme and the effectiveness of the mastery approach, they feel empowered to make more choices in subsequent years. Teachers felt that each *Inspire Maths* unit offered plenty of opportunity for children to practise and then embed their learning, citing the clear and logical progression within units as extremely important in helping them to decide when to move children on to the next block of work.

"The scheme is very well planned and ordered."

Barncroft Primary School, Hampshire

Mastery, progression and depth

All schools commented that prior to implementing *Inspire Maths* they were either not teaching to mastery at all, or had thought they were, then realised they had not been sufficiently challenging their children. **The change in teaching methodology also offered more support to struggling learners** (utilising *Inspire Maths'* spiral curriculum) and to encounter the curriculum together with the rest of the class. Where previously teachers may have addressed the needs of high achievers through differentiation by acceleration, the pace of teaching has slowed and differentiation is through depth. For those needing extra consolidation, schools are using same-day interventions. In all the schools, the commitment to whole-class progression is strong. **Teachers report increased confidence that all children's conceptual understanding is secure before they move on**.

> *"We've realised that previously we were unintentionally 'capping' children's learning, whereas now they have the opportunity to go deeper, exploring and challenging their thinking. There are children who've developed in a way we wouldn't have imagined."*
>
> **Squirrel Hayes First School, Staffordshire**

The benefits of high-quality textbooks

Teachers have gained confidence by following the teaching sequence, and in using the well-constructed questions in the textbooks. **The textbooks have proved a revelation to teachers who might previously have had reservations about using them in their classroom**. The textbooks have given teachers the confidence to model the concrete–pictorial–abstract (CPA) approach in the classroom, and to ask higher-order questions that deepen children's understanding. **The positive impact on teacher planning has also been marked and given teachers space to be more reflective in their approach to their children's understanding of maths**.

> *"There is clear progression through [the textbooks], support for using concrete resources, then showing pictorial representation before moving on to the abstract."*
>
> **Barncroft Primary School, Hampshire**

Summary

- The schools' responses demonstrate that the carefully designed spiral curriculum, combined with the underlying mastery-based pedagogical approach of *Inspire Maths*, creates more time for reinforcement, supporting steady, whole-class progression.
- The textbook programme and the support materials give teachers the information they need to cover topics and concepts with confidence, making sure that their classes successfully deliver the National Curriculum outcomes.
- The much-improved results in statutory assessment for all the schools demonstrate the effectiveness of the programme in improving outcomes and transforming the teaching and learning of mathematics.

2 Report

2.1 Background

The National Curriculum and mastery

> "The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on."

Extract from the Mathematics programmes of study: key stages 1 and 2, National Curriculum in England, 2013[6]

Based on research into the factors that made HPJs successful, the revised National Curriculum introduced in 2014 adopted the ideas of mathematical mastery. It placed new emphasis on whole-class progression, and in differentiation through depth rather than through acceleration. Teaching for mastery would benefit all children, helping them develop deep understanding of mathematics and support their future mathematical development.

The case for textbooks

The 2010 review of the National Curriculum, led by Tim Oates, demonstrated the role of high-quality textbooks in supporting successful teaching. Research revealed that schools in HPJs used textbooks to a much greater extent than schools in England: data published in 2011 showed 95% of schools in Finland and 70% of schools in Singapore used textbooks as a basis for instruction compared to just 10% of schools in England[7]. In his subsequent policy paper, *Why Textbooks Count*[8], Tim Oates argues that carefully designed textbook programmes were instrumental in raising standards in these jurisdictions, and remain key to maintaining those standards. The paper goes on to report how England has gradually moved away from using textbook programmes, and concludes that a failure to recognise the importance of high-quality textbook programmes which support high-quality pedagogy may impede the improvement of education in England's school system.

[6] Department for Education, 2013 'Mathematics programmes of study: key stages 1 and 2, National Curriculum in England'

[7] Mullis I., Martin M., Foy P. and Arora A., 2012 'TIMSS 2011 International Results in Mathematics'. Boston College and International Association for the Evaluation of Educational Achievement

[8] Oates, T., 2014 'Why Textbooks Count', Cambridge Assessment

2.2 About *Inspire Maths*

The *Inspire Maths* programme was first published in 2015 and is the UK version of the leading Singapore series *My Pals are Here!*. This Singapore Ministry of Education approved programme has been used in almost 100% of Singapore's state primary schools for over 17 years. *Inspire Maths* is a whole-school textbook programme, designed to support teachers in delivering the robust Singaporean mastery approach whilst meeting the expectations of the National Curriculum. It is comprised of printed teacher materials, pupil textbooks, practice books and assessment books, supported by online resources. It emphasises the teaching of mathematics through multiple representations of mathematical concepts, specifically the use of a concrete–pictorial–abstract (CPA) approach. *Inspire Maths* focuses on developing children's mastery of fundamental mathematical principles and reasoning skills in order to provide a secure foundation for future learning. This solid grasp of the fundamentals is promoted by the frequent and varied use of manipulatives in lessons, an emphasis on depth over breadth, and teachers' use of a variety of questioning techniques, including higher-order questions.

At the same time, *Inspire Maths* is also intended to promote inclusion within classrooms because it emphasises full-class instruction and mixed-ability grouping. Alongside the textbooks, schools are able to access online resources via the Oxford Owl website. *Inspire Maths Online* supports the textbook components of the programme and offers teaching support, further activities, assessments and guidance to ensure effective implementation of *Inspire Maths*. Schools are supported through sustained professional development, delivered by experts. This report aims to review the positive impact *Inspire Maths* has had on five schools over the several years since they implemented the programme, soon after its UK publication. It highlights improvements in attainment, and demonstrates how schools successfully teach with *Inspire Maths* using the proven Singapore sequencing and progression while addressing the requirements of the National Curriculum Programme of Study.

Previous research

Through the 2015/16 school year, Oxford University's Department of Education tracked the programme's use in schools at Year 1. The findings were published as the *Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England*[9] in October 2016, subsequently independently examined and approved by the University of Southampton. The paper concludes that *Inspire Maths* positively impacted schools in a number of ways, including: increased confidence of both teachers and children, greater depth and security of understanding, development of mathematical language and reasoning skills, multiple ways of accessing and representing concepts, and the use of meaningful extension tasks.

2.3 About the case studies

Schools

Five schools were interviewed regarding their use of *Inspire Maths*. All five schools were early adopters, so have multiple years' experience delivering the programme. Beyond that, the schools cover a range of contexts and challenges.

Process

The schools were sent a short questionnaire, then took part in a detailed telephone interview devised and conducted by independent researchers.

The questions covered a number of areas, including:

- the impact *Inspire Maths* has had on teaching and learning in mathematics
- how *Inspire Maths* supports them in fulfilling the requirements of the National Curriculum
- how *Inspire Maths* helps teachers to teach for mastery at a suitable pace, with clear progression for children working at all levels
- the benefits of using high-quality textbooks for consistency of teaching, teacher confidence and workload

2.4 Case study responses

2.4.1 Adopting *Inspire Maths*

Immediately prior to adopting *Inspire Maths*, all schools were thinking about the challenges facing them in implementing the new National Curriculum Programme of Study for Mathematics, and had got to various stages either in considering, or actually embarking on, using a mastery approach for teaching and learning maths.

The National Curriculum

All schools told us that they were motivated by the introduction of the 2014 National Curriculum to change the way that they taught maths. The National Curriculum promotes achieving mastery through depth of learning, and the schools recognised the need to adapt the way they taught maths in order

[9] Hall J., Lindorff A. and Sammons P., 2016 'Evaluation of the Impact and Implementation of Inspire Maths in Year 1 Classrooms in England; Findings from a Mixed-Method Randomised Control Trial'. Department of Education, University of Oxford, independently examined and approved by the University of Southampton

to achieve this. The focus on reasoning, problem solving and fluency in the National Curriculum Programme of Study were all important considerations, with some schools saying that they were struggling in these areas and were in need of a new approach to help them deal with the issue.

When asked about their maths strategy, all the schools identified similar aims: specifically to improve reasoning, problem solving and fluency; and more generally to increase numeracy, and to help children become confident mathematicians for life. All schools were looking to challenge both staff and children. One school (St Thomas' C of E Primary School) stated that *Inspire Maths* "addressed these areas perfectly".

Mastery

Before selecting *Inspire Maths*, all the schools had identified the benefits of adopting a mastery approach. Some reported that previous maths teaching had not been particularly deep or meaningful; for example, that they had simply been "ticking off objectives" (St Thomas' C of E Primary School). Three schools (Fulwell Infant School Academy, Squirrel Hayes First School and St Thomas' C of E Primary School) said that before adopting *Inspire Maths*, they had already been attempting to adapt their teaching towards mastery. However, they were finding that children were not really achieving mastery. Using the schools' existing resources and practices, children were not being sufficiently challenged by higher order questions or extension through depth, and whole-class progression was not being achieved; schools often wanted to increase the use of CPA, but found this difficult to embed in lessons.

In short, all the schools interviewed had arrived at a decision that they should adopt a mastery approach, with some already trying but failing to do so. *Inspire Maths* gave each of the schools and its teachers and children the tools, approach, and confidence to embed a mastery approach to maths and make it a success for the teachers and children alike.

> "Adults use skilful questioning to check pupils' understanding and challenge their thinking. Questioning by teachers and teaching assistants is a key strength. They prompt pupils well to develop their reasoning and use their growing vocabulary to explain their thinking. Adults check pupils' understanding carefully and quickly identify and tackle misconceptions. Adults focus strongly on developing pupils' language, including technical vocabulary. Increasingly, pupils are learning the correct terminology to express and discuss their mathematical thinking and reasoning. Teachers provide frequent opportunities for pupils to use and apply their mathematics skills in different ways. The most able pupils are often challenged to explain their thinking or show their working in different ways. The improvement for current pupils compared with historical performance data are particularly marked in Key Stage 1 and in mathematics across the school. Current Year 2 pupils have risen well to the higher expectation and challenge of the new national curriculum."

Extract from Barncroft Primary School Ofsted report July 2016[10], after using *Inspire Maths* for a year.

[10] Ofsted, 2016 'Barncroft Primary School full inspection report'

Deciding on *Inspire Maths*

The schools' decision-making processes for choosing to adopt *Inspire Maths* varied. They identified the expectations of the National Curriculum as very high, and were looking for a programme to support children working to achieve the expected standard.

Schools recognised that *Inspire Maths* is a well-researched and constructed programme: "When you unpick the questions in *Inspire Maths* you can see how carefully constructed they are in terms of constantly building on prior knowledge" (Barncroft Primary School).

Most visited another school already using *Inspire Maths*, and this often confirmed their decision. Others made very detailed comparisons to other mastery and non-mastery programmes.

2.4.2 *Inspire Maths*, sequencing and the National Curriculum

Most of the schools interviewed recalled initial nervousness about using an alternative curriculum with a different sequence and progression to the National Curriculum Programme of Study. However, these fears were quickly allayed as they saw that by using *Inspire Maths* they were comfortably able to meet National Curriculum targets, and that the programme provided a wealth of planning information to help them (see **2.4.5 *Inspire Maths*, planning and teacher workload**, below).

> *"We follow the structure of Inspire Maths very closely. Using a different curriculum is a valid concern, but the payoff is that there are more children who become better at reasoning questions than ever before, and who work at greater depth."*
>
> **Rawmarsh Thorogate School, Rotherham**

The training and detailed support provided in the *Inspire Maths* teaching materials helped teachers in the case study schools to ensure every cohort or group made good progress. For example, a teacher describes how clear and valuable the Teacher's Guide was when first teaching the course: "It was very easy to follow and the learning goals were clearly stated. The range of resources are easy to use, and the online resources are fantastic". The same teacher says: "Now we're going into our third year of using the programme, I don't need to follow the guide quite as closely as I'm more confident about what we're doing. This year we decided to change some of the units around a bit to support what's right for each cohort or year, without losing the consistency across the school." (Fulwell Infant School Academy)

> *"Moderation went extremely well: they were very happy with Inspire Maths, and satisfied we were meeting or exceeding the National Curriculum expectations."*
>
> **Fulwell Infant School, Sunderland**

Teachers are similarly confident using *Inspire Maths* to deliver the National Curriculum yearly outcomes, with no fears of missing out on

outcomes, nor of overloading the children. Higher aspirations mean children are exceeding expectations. The support materials help the teachers to navigate the National Curriculum pathway: "The *Inspire Maths* correlation grids map out… the scheme's coverage of the National Curriculum" (Squirrel Hayes First School). The schools are also confident in the programme's coverage, the deep learning it facilitates and the time it creates, both in the classroom and in removing planning effort: "We now have the confidence to take the time to explore concepts" (Squirrel Hayes First School).

2.4.3 Progression

Teachers found achieving appropriate pace and progression to be well supported by the programme. *Inspire Maths* provides the support for teachers to reflect on where the children are at the end of each lesson, and intervene where necessary to ensure all children have a firm understanding of the content. There is clear signposting of when to move on. Achieving understanding for the whole class is managed in a variety of ways, including pre-teaching, in-lesson interventions, and afternoon 'maths meetings' (Barncroft Primary School). These amount to same-day interventions, in which the morning's learning is revisited and consolidated for those who need additional support. Those who have grasped the learning are challenged to deepen their understanding. Barncroft Primary School reported that "we've definitely reduced the long tail of underachievers".

Schools in these studies reported that the pace at which they teach maths has decreased since their introduction of *Inspire Maths*, surprising some schools who at first expected it would be hard to cover all of the content: "Even if you follow all the units in the programme, you have extra time" (Squirrel Hayes First School). "The textbook is structured to allow time for practising and embedding the learning. If we feel that the children haven't got something, we'll simply spend the next lesson going over it again" (Fulwell Infant School Academy).

> *"The pace is appropriate: we only move on when they're ready to move on. It's appropriately challenging."*
>
> **Barncroft Primary School, Hampshire**

The adaptability of *Inspire Maths* to individual children's needs was often highlighted, particularly by the schools in areas of high deprivation. Schools find that the materials support every child in becoming a confident mathematician: "As a school, we specialise in offering a personalised learning programme and yet children have surprised us with what they're able to achieve through independent learning and exploration. Where we've worried about spending time because of the pressure to cover the National Curriculum, we've now realised that taking the time allows the learning to develop, and children become empowered" (Squirrel Hayes First School).

> *"It allows teachers and children to go deeper than just ticking off objectives… The old three-way differentiation doesn't exist. The whole class progresses together."*
>
> **St Thomas' C of E Primary School, Blackburn**

Schools appreciate *Inspire Maths*' spiral curriculum. This allows all of the children to access the same topics. Teachers reported increased awareness, through continuous professional development (CPD) and ongoing use of the programme, of the support for differentiation through depth that the *Inspire Maths* spiral curriculum supports. They praised the high quality of the material, which means it is very easy to drop back a level and be confident that the children are going to cover the necessary content: "The teachers know that if some children are struggling with a certain area you can go down to the appropriate book, and it's going to be quality" (St Thomas' C of E Primary School).

Depth, not acceleration

A common theme to emerge from the case studies is that since adopting *Inspire Maths*, the schools no longer feel pressure to "push the children on" (Fulwell Infant School Academy; Rawmarsh Thorogate School) through National Curriculum objectives. Teachers understand that they are not expected to push the children to accelerate through new content, as they may have done previously. They are confident in the curriculum they are delivering through *Inspire Maths*, and they embrace the mastery approach to whole-class progression. Intervention becomes lighter-touch; differentiation by depth means children aren't falling behind. It is a consistent theme across the schools: at the same time as they talk about higher challenge, the teachers point out that they are slowing the pace in lessons and making more time for reflection and exploration.

> *"If anything, Inspire Maths has lent us space and time to slow down a little bit, and go deeper, and allow the children to explore. If they don't understand, we don't just move on: Inspire Maths provides the material so that we can have the intervention straight away so they can move on together."*
>
> **St Thomas' C of E Primary School, Blackburn**

All the schools noted an important change in teachers' mindset regarding children's ability. All were surprised at how learners previously deemed low achievers were often shown to be able to work at greater depth in various lessons. For example, one teacher explained that "it is not always the most numerate who are best at reasoning" (Rawmarsh Thorogate School). It is clear that the *Inspire Maths* programme is transforming teachers' expectations. For example, another teacher described a similar experience, saying the school now realised that prior to using *Inspire Maths*, they had been "unintentionally capping children's learning, whereas now they have the opportunity to go deeper to explore and challenge their thinking" (Squirrel Hayes First School).

2.4.4 *Inspire Maths* pupil textbooks in the classroom

Most of the schools had had some initial hesitancy about textbook programmes based on past experience and entrenched beliefs about what it meant to use pupil textbooks in the classroom. For example, at Squirrel Hayes First School "we didn't introduce the textbooks [at first] because we were concerned about using them". There was initial concern from teachers at Fulwell Infant School

Academy that *Inspire Maths* was "just another textbook series". But after their experience teaching with *Inspire Maths*, the same school reports "if you follow the structure, you can't teach a bad lesson". The schools now talk warmly about the children's relationship with and attachment to the pupil textbooks, and about the fact that the textbooks contain more variety and engagement than they previously imagined when they thought of textbooks.

> *"At first, we were a little concerned about the textbooks because we felt that our children with behavioural challenges would be distracted. But now the children love maths, and are excited by it, which they weren't previously."*
>
> **Squirrel Hayes First School, Staffordshire**

Schools believed the pupil textbooks are a very important part of the scheme. Children enjoyed using the textbooks, with one interviewee explaining that the children "love the books" and take great pride in having their own copy (Rawmarsh Thorogate School). Several schools talked about how good the questions in the books are: teachers "could see the depth of learning that could be accessed through the questions. It can be surprising that a textbook programme is so strongly driven by a CPA approach; it uses concrete materials more than any other textbook scheme." (Barncroft Primary School). Schools reported that the textbooks underpin reasoning, offer clear progression and are very well structured: "We use the textbook to model effective practice and how to explore a mathematical concept" (Squirrel Hayes First School).

> *"As a result of adopting the programme, our staff are happier and our children are thriving."*
>
> **Fulwell Infant School Academy, Sunderland**

2.4.5 *Inspire Maths*, planning and teacher workload

An important benefit reported by all schools was the reduction in teachers' planning effort. The materials provided by *Inspire Maths* let teachers spend less time on detailed lesson plans. This is not to say there is no work required from teachers, but rather that there has been a change in their approach and focus.

> *"Teachers don't just follow the teaching guides: they add to and annotate the plans to reflect the needs for their children. It's definitely reduced the time spent on planning and means there's greater consistency across the year groups."*
>
> **Barncroft Primary School, Hampshire**

The schools used the medium-term plans provided by *Inspire Maths* instead of daily plans: "Now we use the medium-term plans which we annotate with observations or issues for tracking, but we no longer create a daily plan. That frees teachers up to decide which resources to use, and that works well" (Fulwell Infant School Academy). Teachers are using the time and energy they save from stopping daily planning to take a reflective approach to the children's learning and mastery: "We've completely changed our planning

format to follow the *Inspire Maths* plans, and we've changed our approach to assessment. In planning, teachers are more focused on reasoning, variation, and children really showing depth of understanding and secure knowledge, rather than focusing on procedural learning" (Barncroft Primary School).

> *"Planning is transformed: now [teachers] reflect on the day's practice and look at the children who might not have achieved the objective. … Instead of children being 'stuck' in an ability group, differentiation is fluid depending on how the child has done that day. It gives teachers time to reflect, and ensure that all children are moved on, to consolidate and move to greater depth."*
>
> **St Thomas' C of E Primary School, Blackburn**

2.4.6 Supporting teachers and CPD

The wealth of teachers' materials, including the *Getting Started Guide* and *Inspire Maths Online*, give practical support for teachers to help them successfully adopt and deliver the *Inspire Maths* programme.

Another core part of the *Inspire Maths* programme is its CPD offering. All the schools had five days' initial CPD. The training is intensive, detailed and high quality, and covers the pedagogy and rationale for the programme before introducing the resources. Several schools described how it challenged their understanding of teaching the subject, and deepened their own understanding of underlying mathematical principles. Attending the training gave staff confidence in the effective use of textbooks alongside the concrete materials through the programme's CPA approach.

> *"The training alongside the programme is key. It's unlocked teachers' understanding of how maths develops, right from the start of understanding number and having number sense through to the pedagogy of what makes for effective teaching."*
>
> **Squirrel Hayes First School, Staffordshire**

One school, Barncroft Primary School, felt that the *Inspire Maths* training surpassed that provided in Initial Teacher Training, thus increasing the knowledge and confidence of their NQTs. An important factor in the success of *Inspire Maths* is that schools often visit user and advocate schools in advance of adoption. These informal networks persist as they continue to offer each other support, meaning that sharing of best practice is ongoing.

> *"The NQTs have said that they've learned more on the Inspire Maths course than in their Initial Teacher Training, while the confident teachers have revisited some of their assumptions about teaching maths and reflected on their practice."*
>
> **Barncroft Primary School, Hampshire**

2.4.7 *Inspire Maths* and impact on attainment

Across all the schools there are significant similarities in reported improvements to attainment. Looking at the data available, they have all shown evidence of significant progress in pupils' results since adoption. All the schools reported a change in attitudes regarding expectations and the realisation that all children can succeed. They told us that using *Inspire Maths* has stopped schools from unintentionally capping their children through inappropriate methods of differentiation. In the past, schools would differentiate by allowing children who seemed to understand a concept to move onto the next, ahead of their peers. Now instead, they work to deepen the understanding of these children, while reinforcing the understanding of children who haven't yet understood (see **2.4.3 Progression**). Because the children progress together, all encounter new concepts at the appropriate time. At Squirrel Hayes First School, many children start school unable to access the National Curriculum expectations for their age. Since implementing *Inspire Maths*, 95% of their children are now working at the expected standard by Year 2. Barncroft's 2016 Ofsted report, carried out after Barncroft introduced *Inspire Maths* in Key Stage 1 in 2015, noted improvements against historic data: "The gap between disadvantaged pupils and others at the end of Key Stage 1 this year is tiny"[11].
Teachers also feel better equipped to identify those who can work at greater depth, and to support them. Children's confidence has increased as they realise it is possible for them to succeed. The schools frequently used the word "resilience" to explain that children are now much more willing to explore mathematically: to try to find mathematical explanations or ways of working. Again, the schools in areas of high deprivation find this change particularly significant. The programme helps them to challenge low aspiration. **Barncroft Primary School, one of the schools in an area of high deprivation (47.9% attracting pupil premium) now has 82% of children at KS1 working at the expected standard, well ahead of the national average.** In 2015, the level of children achieving Level 2 was below the national average.

Evidence provided by Rawmarsh Thorogate School shows a marked improvement from 2015 (before they adopted Inspire Maths) to 2018 in the number of children achieving the expected standard in maths, with an increase from 53% to 83% in Key Stage 2.

An additional benefit reported by all of the schools interviewed was the improvement in children's language and communication skills. The emphasis placed on reading the questions and discussion of ideas in *Inspire Maths* has helped all children to improve in these areas, but has had particular impact on those children with language delays. Children take these skills into other lessons. In some cases, it has inspired schools to consider teaching other subjects using a mastery approach (Squirrel Hayes First School).

> *"[The children's] language and communication skills in maths are much richer, and this has transferred to other areas of the curriculum."*
>
> **Rawmarsh Thorogate School, Rotherham**

[11] Ofsted, 2016 'Barncroft Primary School full inspection report'

2.5 Conclusion

Sequencing and the National Curriculum

Teachers use *Inspire Maths*' planning grids effectively to deliver the *Inspire Maths* programme to meet National Curriculum objectives. As the mastery approach becomes embedded, the teachers gain confidence in the extra time they have to enrich children's learning, building on secure concepts to make sure objectives are mastered. They embrace and enjoy the mastery approach, and the whole-class progression it enables. Teachers in all the schools considered that the quality of the mathematical conversation with (and among) the children has improved. This gives teachers evidence of children's understanding of topics, so that they are confident the learning outcomes have been met. The planning materials in *Inspire Maths*, in particular the medium-term plans, clearly direct teachers to achieve the outcomes; and they have the time and resource to make sure any objectives not directly covered within the textbooks are addressed using the National Curriculum activities and assessments provided on *Inspire Maths Online*.

The results in all of these schools in the year groups using *Inspire Maths* demonstrate the success here: all have improved, some very significantly.

Progression and depth

At all of the schools, teachers reported having time to explore mathematical concepts and secure knowledge. Instead of differentiating through acceleration, as they would have done in the past, they focus on improving the depth of children's understanding within a concept. They talk with confidence about the children in the class progressing together; and they present examples where peer-to-peer teaching is stronger because the children have learnt to use richer language to communicate concepts more effectively.

It is evident from the views expressed in the case studies that the teachers are not racing ahead; rather than pushing children on (as they report was past practice), they encourage them to go deeper into a concept, and they see the benefits of this for children of all abilities. Teachers at several schools comment that this helps children to show particular strengths which the children wouldn't have had the chance to demonstrate if they had been 'left behind'. They have confidence in the robust structure of the *Inspire Maths* programme and the careful construction behind its sequencing and content, and feel their practice is strengthened by their ability to use the spiral curriculum to support children who need more help.

While some schools chose the programme because the revised National Curriculum called for a mastery approach, it is *Inspire Maths* itself that they identify as being responsible for their major change in practice. The robustness of the programme (schools frequently talk about teachers' growing trust in how carefully constructed the textbooks and planning are) and their experience of the evident benefits – not just in attainment, but also in pupil confidence, aspiration and enjoyment of mathematics – increases teachers' commitment to steady, whole-class progression supported by differentiation through depth.

Positive effect on outcomes

Adopting *Inspire Maths* has not always been an easy decision for these schools: entirely changing the way a subject is taught is a sizeable challenge, even if that challenge is to be expected with any major change. However, initial concerns were overcome, sometimes very early on, sometimes after having used the programme for a few months.

The improvement in levels of attainment seen in the schools demonstrate the positive impact that *Inspire Maths* is having (for example, two schools have transitioned from below average performance to now have 83% and 95% of children achieving the expected standard). *Inspire Maths* has fundamentally changed how the schools approach maths teaching and learning, while allowing them to meet the aims of the National Curriculum. Moreover, the impact of *Inspire Maths* has been felt across all subjects due to its emphasis on reading and writing skills, and its challenging of expectations. Schools report that children are more resilient and feel more able to try new things in the classroom, no matter what subject.

Summary

The five case studies of the implementation of *Inspire Maths* in a range of contexts have demonstrated that the programme drives the transformation of learning and outcomes. The improvement in test scores is enough to demonstrate the latter, but when we unpick the teachers' enthusiasm in all cases for the greater mathematical engagement – shown by children of all abilities – we find that they are expecting more reflection and investigation from all of their learners. Teachers who would once have differentiated through acceleration are now committed instead to using the carefully constructed content and curriculum of *Inspire Maths* to differentiate through depth, and to make sure that all the children in the class progress together. They see how this benefits all children, including those who may have previously struggled, and are pleased to find that these children can now successfully access the full curriculum with their peers.

These are schools that thought carefully about which resources to invest in at the time of the new National Curriculum. They are confident that their choice of a course with an alternative curriculum has supported them in delivering the National Curriculum objectives, and in successfully preparing their learners for the statutory assessments. This is through the proven effectiveness not only of the structure and high-quality content of *Inspire Maths*, but because of the detailed support in the teachers' materials, and the effectiveness of the medium-term plans.

Together, the case studies demonstrate that *Inspire Maths* is creating classroom environments where children are increasing in confidence and competence, with deeper understanding and enthusiasm for mathematics, and are achieving the National Curriculum outcomes. The commitment of *Inspire Maths* and the teachers who use it to differentiate through depth means that children are not experiencing undue acceleration, and that the practice in all of these classrooms demonstrates an appropriate pace for whole-class progression.

3 The case studies

3.1 St Thomas' C of E Primary School, Blackburn

SCHOOL INFORMATION

Head Teacher and Assistant Head Teacher: Carolyn Morris and Liam Noon

Location: Blackburn

LA: Blackburn with Darwen

Pupils on roll: 477

SEN: 2.7%

EAL: 63.2%

Pupil Premium on roll: 20.5%

Ofsted: Good

Using *Inspire Maths* since: 2016

Year groups using *Inspire Maths*: 1–6

Progress in Maths: -0.7 (2017), +2.4 (2018, results yet to be validated)

*"The teachers absolutely love it. They now have higher expectations, both for the children, and for themselves as well. It's creating that mindset where everyone can achieve. **The programme makes that possible because of how it's structured and scaffolded**, and the teachers know the journey that they're taking pupils on. Children also know why they're doing something, and they know that they will use that learning again, because of the spiral curriculum. It's changed their mindsets, because **they know that everyone can succeed**."*

Background information

The school is a medium to large primary school serving a community with high numbers of children with EAL. In the feedback following their most recent Ofsted inspection in April 2018, the Inspector noted that many children start school with delays, particularly in speech and language, and personal development and social skills. The school works hard to foster a love of learning amongst its children, and Ofsted go on to note that "Pupils enjoy coming to school and love learning. Parents commented that 'from the Nursery class through to Year 6, this school is amazing.'"

Prior to implementing *Inspire Maths*, St Thomas' C of E Primary School followed the Lancashire medium-term plans. They began using *Inspire Maths* in September 2016, and use it across KS1 and KS2. They also introduce elements of *Inspire Maths* in Reception. They use Progress in Understanding Mathematics Assessment (PUMA) tests for summative assessments and a target tracker to identify National Curriculum coverage.

Improving results

In 2017, 76% of children in Year 2 were meeting expectations, and 25% achieving greater depth, both above the national average in a school where 63.2% of children have EAL.

In Year 6, 75% of children were meeting expectations, and just 10% were achieving greater depth, both well below the national average. By 2018, 95% of children are meeting expectations, and 33% are achieving greater depth, both well ahead of the national average[12].

The average progress score has gone up from -0.7 in 2017 to +2.4 this year[13].

[12] Based on 2017's national average, where 75% of children are meeting expectations, and 23% achieving greater depth (Department for Education, 2017 'National curriculum assessments at key stage 2 in England, 2017 (revised)'

[13] Provisional results subject to validation

Adopting *Inspire Maths*

We were using the medium-term planning grids, and we'd begun to take a more focused CPA approach as a school, and began to make links within what we were teaching, especially via the calculation progressions. However, when the "new" curriculum came in, we felt we needed something different as we didn't feel we were fulfilling the three main areas of the maths National Curriculum: problem solving, reasoning and fluency. We researched the various Singapore-style programmes out there and went to visit a school that was using *Inspire Maths*. We felt it was perfect for our school, as it addressed the three areas perfectly. The approach provided depth, a focus on higher-order questioning, and challenge.

Because we had begun the CPA approach, we wanted a scheme that continued that approach. It was also hitting those areas of the National Curriculum. We also wanted to make sure the scheme was challenging, and we felt that *Inspire Maths* provided more challenge than the other schemes available: it raised the bar. That might turn some people off, but now we've got pupils achieving greater depth. The programme had that methodical approach and structure going through. So the challenge grows through the programme, but there's also the opportunity to supplement with other resources.

We were looking for something that supported the National Curriculum, followed the CPA approach, and challenged the children. We also wanted something that would enthuse our teachers. The way *Inspire Maths* looks, the supporting rationale, the step-by-step teacher guides; I just felt that teachers would benefit from it, and it would enhance their skills as practitioners. It makes them feel more confident. It allows teachers and children to go deeper than just ticking off objectives.

The teachers absolutely love it. They now have higher expectations, both for the children, and for themselves as well. **It's changing to a mindset where everyone can achieve. The programme makes that possible because of how it's structured and scaffolded, and the teacher knows the journey that they're taking pupils on. Children also know why they're doing something, and they know that they will use that learning again, because of the spiral curriculum. It's changed their mindsets, because they know that everyone can succeed.** The old three-way differentiation doesn't exist. The whole class progresses together, and the children who understand soonest are now equipped with the language to explain their insights to others.

The impact of *Inspire Maths*

We weren't expecting the impact it's had on the school. It's revamped maths; like a breath of fresh air. The way the children approach the questions: it's that resilience and willingness to give it a go because they've got a method to apply, and the confidence to tackle it. Before, they didn't have that confidence, that discussion in the classroom, with children using mathematical language and thinking mathematically. If they have got an answer one way, they will try to get it other ways, to decide which is the best and quickest way of answering it. *Inspire Maths* has trained our teachers to use different methods, and the pupils follow it. It's given them the freedom to get something wrong. They're curious and exploratory in their maths. It's not just the higher end pupils; it's everyone.

Using *Inspire Maths* alongside the National Curriculum

You're going to get pupils of different abilities anyway. The thing is that the teachers know that if some children are struggling with a certain area you can go down to the appropriate book, and it's going to be quality. It's well-structured and scaffolded, with clear objectives. But it also quickly weans the children off the scaffolding so that they become more independent.

There are overview documents of the content of each book and an online index. Everything is there for teachers. They know the children, and have an overview of where, when and why they want to teach topics.

Teachers are far more confident because they know the journey. **Within a unit, there's a logical progression which is clear to teachers,**

so they know why things are done in that way. They like the depth; they don't feel they have to rush things.

Pace and progression

Because you have to teach the KS2 curriculum in Year 6, teachers drop back into previous books to teach the skills and concepts that will be tested. They know they've got a supportive textbook. They do drop back into Book 5 because a lot of the Year 6 curriculum is covered in that, but in Book 6 they're looking at pie charts and algebra. They know that what they're teaching is quality and depth, and the questions in the practice books, teachers books and assessment books are probably more challenging than the questions in the SATS paper, so it stands the children in good stead. **We're very fluid with how we use the books. If the teacher has to cover an objective that's not in the book for their year, they'll drop down to previous books to give them that foundation and move them on.**

Supporting children working below and above expectations

That depends on the teacher, and the way that they teach, and especially the use of questions to move them on. For those working at greater depth, how are they explaining things to their partner? You need to then reflect on where the children are at the end of the lesson, and whether some need a quick intervention, while others might do some "Put On Your Thinking Caps!" activities. It's the responsibility of each teacher to make sure that children keep up. They make sure to use resources and manipulatives so children can visualise, then draw, before moving onto the abstract.

If anything, *Inspire Maths* has lent us space and time to slow down a little bit, and go deeper, and allow the children to explore. If they don't understand, we don't just move on: *Inspire Maths* provides the material so that we can have the intervention straight away so they can move on together.

Interventions

We don't do "interventions" as such. Our pupils who need a bit more support will receive it in the afternoon of the lesson. What we've taken away from *Inspire Maths* is using more concrete resources. Everyone can do the maths if they use concrete resources and explain what they're doing. We use some of the online support like the illustrations to scaffold children's talk, but again, not structured "interventions" as such.

Supporting teachers

The CPD was very important for us to understand the background to the programme, and how to use the resources, giving us the confidence to use it. The first two days were about the pedagogy and rationale, and then we looked at resources.

Now there are the advocate schools, which are quite inspirational themselves, and it's nice to see the different ways they're using *Inspire Maths*. You always have one of the consultants at the end of the phone to support you, and give good advice.

It's got a good balance between questioning, games, and exploratory activities. Teachers know their children, so they know if they need more time to explore a teaching sequence. They use their professional judgement and the support in the programme to decide on the appropriate pace.

The school's maths strategy

Our vision for maths is for all children to be mathematicians for life, and not depend on some "innate" academic ability. We want them all to succeed, and feel that *Inspire Maths*, with its CPA approach, provides the children with the opportunity to develop at their own level, and move forward at their own pace. Having the concrete resources alongside pictorial representations, then the abstract, supports everyone's learning. It's not *just* about getting the best results possible. When they move on, we want them to build on the skills we're giving them.

We first looked at a CPA approach within our calculation policy, but we weren't really embedding it across other areas of the maths curriculum, which we wanted to. With *Inspire Maths*, everything we teach in maths has that

CPA focus. But it's also going the other way, so you also go abstract, concrete then pictorial: you interweave.

Inspire Maths has changed the way we think as teachers. We've been able to reflect more on how and why we teach maths, what the end game is, and developing confident and resilient mathematicians. The whole approach of the programme supports that.

Planning and teaching

Before adopting *Inspire Maths* we were using the medium-term planning grids, and it was very much "same old, same old". Each term, you'd cover the same objectives again. We felt it was very bitty, and there wasn't much depth. **We were ticking off objectives, rather than teaching in any depth. We weren't developing children as mathematicians.** Teachers were looking for coverage, with no real understanding of why they were teaching those objectives.

Inspire Maths has lightened teachers' workload, because the structure and extra resources allows them not to waste time. Planning is transformed: now they reflect on the day's practice and look at the children who might not have achieved the objective. Pupils that would have been put in the middle group may now be exceeding. Instead of children being "stuck" in an ability group, differentiation is fluid depending on how the child has done that day. It gives teachers time to reflect, and ensure that all children consolidate learning and move on to greater depth.

Teachers' own mathematical language has been massively increased. Their subject knowledge has improved. It's also supported their development as teachers because they see things in different ways: it's extended their thought processes as mathematicians over what they want to teach. They identify higher order questions, and they expect children to answer them; and if the children get it wrong there's much more of a focus on *why* it's wrong. ***Inspire Maths* itself supports teachers in asking the right questions, which helps the children progress.**

Part of the improved quality of teacher questions is due to an in-school improvement initiative. Lesson observations now focus on greater depth and higher order skills. The practice books and teacher books provide high-quality questions.

Supporting a mastery approach

The mastery approach has driven the higher expectations, but *Inspire Maths* has changed our mindsets. So you can say a mastery approach is more challenging. *Inspire Maths* has done that for us, and staff can see it. It's hard to say if other programmes lend themselves to the greater depth and higher expectations, but *Inspire Maths* does. The pupils' mindsets have changed as well, because they can see their mathematical thinking evolve during the lessons. They now have a can-do attitude.

The importance of the textbooks

The textbooks are very well structured. There is clear progression throughout, support for using concrete resources, then showing pictorial representation before moving onto the abstract. It's not just one thing – as well as everything else, you've got games, and a variety of activities.

Advice for other schools implementing *Inspire Maths*

Choose *Inspire Maths* because of the way the programme is structured. **It completely changes your approach to maths, and the way that staff and pupils think about maths.** We personally wouldn't introduce it a year group at a time, but would advise a whole school adoption. You have to think strategically about what you're wanting to achieve for your school; you can't just pick it up and run with it. Plan how you want to implement it. **You've got to get your senior leadership team and governors on board too: they all need to believe in your vision for maths at the school.**

3.2 Fulwell Infant School Academy, Sunderland

SCHOOL INFORMATION

Head Teacher and Maths Co-ordinator: Wendy Angus and Emma Hopkinson
Location: Sunderland
LA: Sunderland
Pupils on roll: 370
SEN: 1.9%
EAL: 3.3%
Pupil Premium on roll: 7.9%
Ofsted: Outstanding
Using *Inspire Maths* since: 2016
Year groups using *Inspire Maths*: 1–2

*"**There isn't a child who now feels that they can't do maths**. They can problem solve, they can work on their own. We've stopped thinking that some children aren't capable of working at a certain level because those children might now be top of the class. **You can't put a limit on children's learning using** Inspire Maths."*

Background information

Fulwell Infant School Academy in Sunderland is a three-form entry school and is part of the Jigsaw Learning Trust. One of the school's stated aims is "to maintain high standards of education, whereby each child is encouraged to achieve their maximum potential". It is this philosophy which led them to adopt *Inspire Maths*. Historically, the school has performed better in reading and writing than in maths, and one reason to choose *Inspire Maths* was its aspirational curriculum, which would stretch and challenge the children. Unlike the infant school, Fulwell Junior School is not part of the Jigsaw Learning Trust. They have adopted *Inspire Maths* on the recommendation of the Infant School. This means there is continuity from children moving from Year 2 into Year 3.

Prior to implementing *Inspire Maths*, Fulwell Infant School Academy was following the National Curriculum objectives and interim statements. They followed the *Inspire Maths* transition programme with Year 1 in 2016 summer term and now use *Inspire Maths* across Year 1 and Year 2.

Improving results

In 2015, 97% of children in Year 2 achieved Level 2 and above. In 2017, 89% of children the same age were meeting expectations and 34% were achieving greater dept. In 2018, 86% of children were at ARE and 34% at greater depth, both much higher than the national average[14].

Adopting *Inspire Maths*

Historically, the school has been better at reading and writing. We felt that the children could be stretched further in maths. With the change in the curriculum, schools were encouraged to follow a CPA approach.

We'd started moving to a mastery approach a year before buying the scheme. We were trying to have one learning objective in each lesson for pupils to meet, using the CPA approach. And that was working, and we were enjoying it, but we felt our children could be challenged at a higher level.

Inspire Maths is based on the Singapore way of teaching, modified to support the English curriculum, so we know we're meeting the expected standards. We really like the idea of all children accessing the same objectives in a lesson and the fact that it supports all learning styles.

[14] Based on 2017's national average, where 75% of children were meeting expectations, and 23% achieving greater depth (Department for Education, 2017 'National curriculum assessments at key stage 2 in England, 2017 (revised)'

We found out about the programme through word of mouth from a school whose Head had been to Singapore and seen first-hand the transformative effect of teaching for mastery. We visited their school, and seeing *Inspire Maths* in action immediately made our decision, especially when we saw the improvement in that school's results, and not only in maths: it was also impacting on their reading results. It was a no-brainer for us to decide to use it. It was very attractive because it supported the mastery approach which we were being encouraged to adopt. We looked through the textbooks and journals. Even though it felt like a lot of money, we viewed it as a long-term investment.

The impact of *Inspire Maths*

We love the way *Inspire Maths* boosts children's reading skills, teamwork and collaboration, enabling them to become more independent. The *Inspire Maths* curriculum is more challenging, and typically the children are working a year above the National Curriculum expectations. It also frames the questions in a problem-solving context. We felt we needed more focus on reasoning, too, as this is what staff were struggling with, rather than fluency. As teachers, we like the structure. It encourages all aspects of learning theory to be covered in a lesson. It's very visual and child-friendly, so they can see how each lesson builds on the previous one: you see it all come together. We have three-form entry, and we like the idea that each class is accessing the same lesson, and every teacher following the same approach. As a result of adopting the programme, our staff are happier and our children are thriving.

Using *Inspire Maths* alongside the National Curriculum

It's true that in Year 1 children encounter Year 2 curriculum content, but we have extra weeks throughout the programme where we can cover National Curriculum statements that might not otherwise be achieved. In Year 2, we also have the interim statements to cover, so each Friday, one of our maths lessons focuses on the interim statements, and that's worked fantastically for us.

This year we were externally moderated. We had all the evidence for all the statements, as well as a comprehensive *Inspire Maths* journal to show we've covered it very well across Year 1 and Year 2. The moderator was very happy with all our judgements; the only judgement that was changed was from an expected to a greater depth. Moderation went extremely well: they were very happy with *Inspire Maths*, and satisfied we were meeting or exceeding the National Curriculum expectations.

We follow the programme very closely. We have every resource and component that comes with the programme, and we bought each child their own textbook and journal. We use the online resources closely, and really try to make sure we get the full experience. Even though it is a structured scheme, you still have the freedom and flexibility as a teacher to put your own spin on things. One of the concerns about adopting a scheme is that you can feel you can't express your individuality as a teacher, but *Inspire Maths* can be adapted to the needs of every classroom. The online resources are invaluable.

At the beginning, we followed the teaching guide religiously, and it was very easy to follow and the learning goals were clearly stated. The range of resources are easy to use, and the online resources are fantastic. We can put the textbook onto the screen for the children to follow. The less confident teachers are well supported through the teaching books, and the clear structure. In my opinion, if you follow the structure, you can't teach a bad lesson.

Now we're going into our third year of using the programme, we don't need to follow the guide quite as closely as we're more confident about what we're doing. This year we decided to change some of the units around a bit to support what's right for each cohort or year, without losing the consistency across the school.

Pace and progression

The textbook is structured to allow time for practising and embedding the learning. If we feel that the children haven't got something, we'll simply spend the next lesson going over it again. The pace has definitely got even better this year, because we're feeling more confident about using it.

Supporting children working below and above expectations

What we've tried to do is support the children within class using our teaching assistants. As soon as we see a child is having an issue, we deal with it straight away. The majority of children cope very well with *Inspire Maths*, and in the 2017/18 year there were only three children (all with education, health and care plans) who couldn't access it. We do sometimes pre-teach if some haven't quite grasped a concept. They have the concrete apparatus at each table, so they can have a play to see if they can work it out for themselves. In the two years we've been using *Inspire Maths*, we've seen a reduction in the number of children who are lagging behind expectations. Again, it's amazing what they can achieve if they're exposed to a high-quality structured scheme with the right resources like *Inspire Maths*.

In the past, children doing well would have been given more of the same, but perhaps "with a bigger number". But what you realise with *Inspire Maths* is that some children who might have a very good abstract understanding might struggle to represent it pictorially or using manipulatives, so that became a challenge for them. The problem-solving in the books definitely challenges the children, and the assessment book provides further challenge, and of course the programme is based around a more challenging curriculum anyway. There's been no difficulty in challenging these children, without pushing them on.

What I love about the scheme is that although it provides everything, it doesn't stop you from incorporating other resources. I feel as teacher, we have a lot of freedom to use it the way we want to.

Supporting teachers

Sometimes teachers become used to teaching in a certain way and are wary of textbooks, assuming that it's "just another textbook series". Some teachers were perhaps concerned about the level of challenge, but once they got going, they were in awe of what the children could achieve, so any concerns were ironed out early on.

Firstly, all our teachers went on the five days' training. It's essential for all staff, and not just the maths lead, to benefit from the training so that they can understand the underlying rationale of the programme and have that clear vision of what they're hoping to achieve. The Maths Coordinator supports staff and helps to address any concerns or questions. We discuss it at staff meetings, and training from OUP is very helpful.

The training talked about how all children learn differently, but must all be exposed to the same learning objective. It showed us how to teach in a way that supports all children, but also works for our staff. We're now very confident with it. We've compiled our own bank of interactive whiteboard resources to dip into in future years. It's important that staff feel that they can raise any issues or concerns openly, and they will receive the support they need.

The school's maths strategy

Our strategy is led by the National Curriculum, which informs what we need to cover. We want each child to succeed and achieve mastery of all statements. We need to support those who struggle to access the statements, and ensure that we challenge the high attainers, which make up a large percentage of our intake. Our aim is to provide a curriculum that individually caters for the needs of each child. We want all staff to share the same level of understanding, and have access to the same high-quality resources, training and tools. Our parents are fully informed, so they can support their child at home, and understand why we've taken certain approaches.

Planning and teaching

It's creating a lot of discussion about maths amongst staff. We're discussing our teaching much more, and the approaches we take. Our Teaching Assistants are much more involved, and they feel they've been upskilled by using *Inspire Maths*, because generally speaking they don't get as much formal training as teachers.

We don't change the teaching sequence within a lesson, as every teacher knows how important that is.

Previously, we would create handwritten plans. Now we use the medium-term plans which we annotate with observations or issues for tracking, but we no longer create a daily plan. That frees teachers up to decide which resources to use, and that works well. Children work in mixed ability pairs on the carpet for "Let's Learn" and "Put On Your Thinking Caps!" Sometimes children might choose to work with their partner, or go and sit at the literacy table, sometimes they might want to work independently, so we're quite fluid in the way we allow them to work. That allows better readers to support children who may be fantastic at maths, but struggle to read the questions. That's then improving their reading skills, which has been really positive.

Without a doubt, *Inspire Maths* has had a positive impact on teacher workload, because they're no longer spending time on planning, and all the resources are there for you. The school has also bought Dienes maths equipment, so the programme allows staff time to focus on the teaching.

Supporting a mastery approach

Inspire Maths has provided staff with a clear vision of what they want to achieve with their maths teaching, but **the real surprise has been the impact on the children. I can't believe their enthusiasm, and the independence we're seeing in the way they work, as a result of using *Inspire Maths***. They have ownership over their journals, they love the way the scheme looks, and they're so enthusiastic about every lesson. That for me has been the biggest gain: seeing the children's confidence. There isn't a child who now feels that they can't do maths. They can problem solve, they can work on their own. We've stopped thinking that some children aren't capable of working at a certain level because those children might now be top of the class. **You can't put a limit on children's learning using *Inspire Maths***. Previously the traditional differentiation approach we used almost forced teachers to make assumptions about children's ability, but with *Inspire Maths*, it allows every child to reach their potential.

The importance of the textbooks

Firstly, from a child's perspective, they are very straightforward, and structured. They start with the basics and build from there. We like the way that it supports the focus on a concrete approach. We've got visualisers, so we use these for the concrete step, then pictorial. We then make the connection with the abstract. Concepts are worded in different ways, but it also gives repetition, so it reinforces the learning and supports the fluency that they need to do well in SATs, but also challenges them with problem solving and reasoning, so it's not just the same boring questions again and again.

Advice for other schools implementing *Inspire Maths*

If I describe *Inspire Maths*, **it is our view of a perfect scheme**. It offers online resources, and supports the National Curriculum correlation, so even though it exceeds the standards, we know how our children are doing against the statements. We love the fact that it provides our medium and long-term planning, so that ensures that all staff are on the right track. That then also gives extra time to prepare and plan resources which ensures that the children get the best out of the scheme. **It's very structured and well thought out: they've really considered every last detail**. We start with posing a problem to the class, then looking at a problem together, allowing the children to discuss it with each other, then use questions to see how well the children have grasped it. They then practise it, and it moves to something more challenging for those who are capable. It brings out so much discussion in the children – it allows them to compare and contrast ideas with each other.

We love the fact that it has all the homework resources. It's very parent friendly. It comes with a PowerPoint for parents so they're informed. It comes with tests to check progress which we're planning to start using from September. We really love the fact that everybody is "on the same page" and is using the same approach, so we can help each other out.

3.3 Rawmarsh Thorogate School, Rotherham

SCHOOL INFORMATION

Head Teacher: John Barnett
Location: Rotherham
LA: Rotherham
Pupils on roll: 205
SEN: 0%
EAL: 0.6%
Pupil Premium on roll: 21.5%
Ofsted: Good
Using *Inspire Maths* since: 2016
Year groups using *Inspire Maths*: 1–6
Progress in Maths: +2.7 (2017)

"We put a lot of time and thought into choosing Inspire Maths. So far, it's been good and I believe in it. It's the right decision for the school. Our KS1 maths results have gone up."

Background information

Rawmarsh Thorogate School in Rotherham is an infant and junior school which historically has done better in reading and writing than in maths. Since adopting *Inspire Maths* in September 2016, their maths results have improved dramatically and the Head Teacher, John Barnett, attributes this to *Inspire Maths*. The school didn't adopt a new programme without a degree of trepidation: initially staff were concerned about the higher level of difficulty, and worried they might make lessons inaccessible for lower attainers. Experience with the programme has brought them much greater confidence. The successful implementation is largely due to the backing and support of the Head Teacher.

Prior to implementing *Inspire Maths*, Rawmarsh Thorogate did not follow a specific maths teaching scheme.

Improving results

In 2015, just 53% of children in Year 6 were achieving the expected level in maths[15]. By 2017, this had risen to 83%, expected to be maintained in 2018.

Adopting *Inspire Maths*

It was very challenging, which is what we wanted; very structured, very hands on with the practical side, and we felt it was well organised and easy to use.

Consistency across the school was a huge priority. We wanted a clear journey for children as they progressed through school. We wanted a familiar process and a common language for our pupils which would then support their literacy. Tying into the focus on oracy developed through explaining and using full sentences which we've applied across the curriculum was also important. *Inspire Maths* enables children to become better at talking about maths, and the better they can explain, the more they can understand.

We looked at a lot of different schemes, including *Maths – No Problem!* and another Oxford one. We visited several advocate schools to find a programme that fitted our school's requirements best. It was a big decision because of the level of investment required. Our governors decided to support it hook, line and

[15] 86% were at or above Level 4, 72% Level 4b and 28% Level 5, all below the national average

sinker: the recommendation is for one textbook between two pupils but we've bought one per child. So far, it's been good and I believe in it. It's the right decision for the school. Our KS1 maths results have gone up.

We put a lot of time and thought into choosing *Inspire Maths*. We were looking into a mastery approach; at the time we thought we *were* doing mastery, but in hindsight our lessons weren't challenging enough.

Using *Inspire Maths* alongside the National Curriculum

We follow the structure of *Inspire Maths* very closely. Using a different curriculum is a valid concern, but the payoff is that there are more children who become better at reasoning questions than ever before, and who work at greater depth. Also it's not always the most numerate who are best at reasoning: we've had those who've been deemed poor mathematicians see their status in the class go up quite dramatically. In Year 6, we stop working through *Inspire Maths* in February. We go back and revisit areas that will be assessed in the national tests. In my opinion you'd get that in any scheme, and as you approach the statutory test, you need to prepare the children. Call it a revision period!

Pace and progression

Rather than pushing children on, we focus on ensuring we've covered the assessment framework statements. Both the children and teachers have engaged with an aspirational curriculum. It's a challenge the first time round: in the first year, teachers weren't yet confident, not having gone through the process before. Now we have high expectations of the children, and the belief that children can achieve against the greater challenge.

Supporting children working below and above expectations

The programme supports children working below expectations extremely well, although as a school we need to think about how well we use *Inspire Maths* to challenge the most able. We've just done a book survey, and have found that the more difficult, stretching questions haven't been covered. This isn't because the children aren't capable of doing them, it's because teachers aren't yet asking them to tackle these questions. This is something we need to work on as a school.

Schools always need to reflect on how the most able are supported, and that often comes down to staff CPD.

Supporting teachers

It's very supportive. We would recommend the training as vital to adopting *Inspire Maths*, although once you've had it, the resources are easy and straightforward to use. It's much more than just a "how to use this scheme" training programme: it's about the conversations that underpin the questions. Staff had to realise that it's not like other schemes, where you start at question 1 and work your way through.

The Year 1 books are a good case in point of how useful the training is: the material is so focused on discussions, and how to ask the questions, that it's important the teacher is helping the class to access that. The richness comes through the interactions between pupils and the teacher. That needs to be pointed out through the training.

As an advocate school, we get a day's training each year. We're also involved with our local maths hub, and even though we use *Inspire Maths* we continue to engage with other maths groups.

The school's maths strategy

Currently, we do have an issue further up the school where there are gaps between the ability of the lower attainers, and those working at the expected level of the scheme. We sometimes set the children, or put in place intervention support in class, sometimes using peer or teaching assistant support, and we may do pre-teaching or catch-up teaching. On the whole, even the less confident speakers fare well with the programme because they know that they all have to describe what they're doing.

Planning and teaching

The planning is very well supported through the scheme, although teachers still have to invest time in getting to know it, and plan for their lessons. We sometimes pre-teach concepts and do catch-ups, and teachers have to be creative, particularly in terms of how to approach the reasoning. It has made planning easier, because they've got the medium-term plans in the teacher books. We've kept our teachers in the same year group, so they're now much more familiar with the material, and can draw on their previous experience of teaching the content, so they know if they need to do a bit of pre-teaching or approach the unit slightly differently. That said, we do stick to the programme closely. I tell my staff that they can add in, but not take out, material, and that's about knowing your cohort.

Supporting a mastery approach

As a school, in the past we've been guilty of teaching a skill and then practising it twenty times, just changing the numbers. There's limited benefit to that! In *Inspire Maths*, the questions are not just a list of similar questions: they underpin the reasoning. *Inspire Maths* doesn't expect children to do a lot of repetition; it's looking at the depth of the question. There's far more discussion about maths, both teacher talk, and discussion amongst the children themselves in groups, pairs or whole class. Children are expected to provide coherent explanations in full sentences, and to scrutinise their own ability to explain things clearly. The talking encourages self-reflection, and we hear them saying "now that I've had to talk about it, I would do it differently."

Children are now more confident and creative in their approach to maths, as they realise that there's more than one way of tackling a problem. They are enjoying maths more, even those who historically weren't the high fliers. **Their language and communication skills in maths are much richer, and this has transferred to other areas of the curriculum.**

The importance of the textbooks

A lot of the training was around the background and pedagogy. In KS1, the approach is different to that in KS2. Textbooks are new to KS1, and possibly the idea of working through a textbook is not just answering the questions but reframing them in different ways so they learn from a young age that you can talk about representations in different ways.

3.4 Squirrel Hayes First School, Staffordshire

SCHOOL INFORMATION

Head Teacher and Numeracy Leader: Erica Pickford
Location: Stoke-on-Trent
LA: Staffordshire
Pupils on roll: 137
SEN: 37%
EAL: 0%
Pupil Premium on roll: 43%
Ofsted: Good
Using *Inspire Maths* since: 2016
Year groups using *Inspire Maths*: 1-4

*"**The children** are far more confident and **see themselves as mathematicians**. They look forward to and enjoy maths lessons, and are not afraid to take risks, and challenge themselves. They're more resilient as learners, because they understand that it's not about always getting the right answers: it's about exploring and developing."*

Background information

Squirrel Hayes First School in Stoke-on-Trent is a small school with high expectations for its learners. Its aim is to "achieve the highest standards in learning and attainment for all members of our learning community". The school is in one of the most deprived regions in England, and many children start Reception significantly behind age-related expectations.

Prior to implementing *Inspire Maths*, Squirrel Hayes First School had their own personalised programme for maths. Squirrel Hayes First School track progress in maths by tracking children against age-related expectations and conversions between these. They also track rates of progress.

Improving results

The school has seen a dramatic improvement in KS1 maths results, with the percentage of children achieving the expected standard going up from 57% in 2016, to 72% in 2017, then to 95% in 2018, with 35% of children now working at greater depth.

Adopting *Inspire Maths*

We have a number of learners with SEN or complex social and emotional challenges, and a high proportion of pupil premium children as we're in one of the most deprived areas in the country, so a lot of our learners start school significantly behind. That means they're not able to access the National Curriculum expectations for their age. Because *Inspire Maths* is based on using manipulatives and follows a mastery approach it has enabled children who previously couldn't access the age-related curriculum to do so. It's definitely made a difference there, because we now have more working at age-related expectations. Previously, we were struggling to identify children working at greater depth, and how to challenge them. The whole Singapore approach has enabled us to support these children.

We wanted to improve maths standards across the school and ensure that our learners were being taught through a mastery approach to maths. That's how to meet the expectations of the National Curriculum, where the emphasis isn't moving them onto the next years' objectives, but to take them deeper into their learning. As a school, we wanted to understand the pedagogy underpinning the teaching of

maths, so that teachers and children have access to the best quality resources.

It was the decision of the Head (also the Maths Lead), along with a teacher who advises on maths. We'd been trying to improve our maths results, and plateaued at a certain level, so were looking at different maths approaches. The Head had done some research into the Singapore approach, and read the DfE information about Singapore textbook-based schemes.

Before adopting it, we went to see a very high-performing school with 100% achieving the expected standard, to see why they wanted to change to *Inspire Maths* when they already had such fantastic results.

The impact of *Inspire Maths*

Staff were less concerned about the aspirational aspect of the scheme because we have high expectations, and more about the whole-class approach and use of textbooks because that's very different from our school ethos. We have a very individual personalised curriculum, and staff were concerned that we were moving away from our view of "good practice".

Now they have seen the impact on the learning, they love it. We've recognised that previously we were unintentionally "capping" children's learning, whereas now they have the opportunity to go deeper, exploring and challenging their thinking. **There are children who've developed in a way we wouldn't have imagined**. At first, we were a little concerned about the textbooks because we felt that our children with behavioural challenges would be distracted. But now, the children love maths, and are excited by it, which they weren't previously.

The training alongside the programme is key. It's unlocked teachers' understanding of how maths develops, right from the start of understanding number and having number sense through to the pedagogy of what makes for effective teaching. It's not a scheme you can pick up and run with: the training and professional development is essential for developing self-reflection among staff.

Using *Inspire Maths* alongside the National Curriculum

If you want a textbook just to pick up and hand out, then *Inspire Maths* isn't the right scheme. *Inspire Maths* is an approach to teaching maths; it supports you in becoming a better teacher. We didn't use a scheme before *Inspire Maths*, so we weren't expecting *Inspire Maths* to do all the work for us. We have an expectation of what we think learners can achieve, but I've realised it enables children to explore and reflect on their learning. It encourages them to use a wide range of manipulatives, and you spend a lot of time unpicking a concept before you use it. Previously, we told children how to do a calculation by giving them rules to follow without allowing them to make connections, or have the chance to spot patterns and relationships for themselves.

The *Inspire Maths* correlation grids map out exactly how the programme covers the National Curriculum, and we've addressed any gaps through our own teaching. Even if you follow all the units in the programme, you have extra time to supplement it with your own resources. The staff don't find it a problem. It's more of a focus for the assessment year groups. The programme has even inspired us to look at how we teach other subjects in terms of a mastery approach, so they can make more purposeful links in children's learning.

We now have the confidence to take the time to explore concepts, and to supplement the programme with additional resources where we feel it's necessary to meet the National Curriculum statements.

Pace and progression

We've had to revisit our tracking and assessment statements, because before we were assessing against coverage, whereas now we track what's been taught, as well as monitoring their depth of understanding and which stage of learning they're at: concrete, pictorial or abstract. **Now we've got children working at greater depth, rather than moving onto the next year's objective**.

Supporting children working below and above expectations

We used to use personalised challenges and write the steps for success for the different levels of challenge within our maths progression, and then match them to the children. The approach now is that all children start at the same stage. We start with exploration, then move onto a stage of qualifying their understanding and making links to previous knowledge, and that's where you identify misconceptions. Then they progress onto consolidation and practice, and finally onto application. Previously we were trying to do that entire sequence within a lesson, and we realise that we were moving children on too quickly, and not giving them time to embed their learning.

Supporting teachers

You do need the high-quality training that underpins it supported by your own CPD: that's what makes it an effective programme. All our staff have had the initial training, plus additional training and then fortnightly maths meetings to share good practice and allow more experienced teachers to support those who are less confident.

The training from OUP went back to the basics of teaching maths and looked at what effective practice looks like. **It's challenged our understanding of maths and raised our understanding of the underlying principles**. After the first two days, I came away with lots of questions, but as you go on to the third and fourth day you start to make sense of it, and by the last day we couldn't wait to start using it. It's not really training on how to use the scheme; it's more about the mathematical approach.

It's a challenge to adopt a whole new approach, and staff have had to rethink their understanding of how maths is taught. We all found it quite hard to start with, but we persevered and are confident now. My maths buddy and I have attended additional *Inspire Maths* training, we've bought in training for staff, and we run our own in-house training.

The school's maths strategy

We want to continue to raise standards in maths across the school. We also want our learners to follow a mastery curriculum.

Planning and teaching

We follow the programme very closely. We use the medium-term plans, supplemented with our own planning. The guidance is there to support your progression through the unit. We use all the books with each individual learner apart from the assessment book, which is used to inform assessments and further challenge.

In fact, we use a range of assessments: PUMA maths tests and our own internal tests, alongside the *Inspire Maths* tests, to triangulate our evidence.

Supporting a mastery approach

Both the children and teachers have engaged with an aspirational curriculum, and they take on so much more. It's a challenge the first time round: in the first year, teachers worried that they couldn't follow the programme with certain children. A lot of that was due to teacher confidence, and not having gone through the process before.

Now we have high expectations of the children, and the belief that children can achieve the harder curriculum.

The scheme starts in Year 1, and as part of *Inspire Maths* training we looked at pre-Year 1 teaching. If you don't get the foundations in basic number sense right, the problems accelerate and become compounded. Quite quickly, children become rather sophisticated in their language and problem solving. It's particularly effective for children who aren't natural mathematicians because they can use the concrete resources. Because it's a mastery curriculum, you're constantly revisiting skills. **The questions are carefully formulated to encourage children to look for patterns and make connections**.

The children are far more confident and see themselves as mathematicians. They look forward to and enjoy maths lessons, and are not afraid to take risks, and challenge themselves. They're more resilient as learners, because they understand that it's not about always getting the right answers: it's about exploring and developing and it's OK for it not to work out each time. It's the self-reflection that this prompts that's important, and for children to reflect on why it didn't work, and what they would do differently next time. Children love maths, because they feel successful.

A lot of our children start school with very poor SLC (speech, language and communication) skills, and *Inspire Maths* promotes speaking in full sentences and using the correct mathematical terminology to explain their thinking, which has had a knock-on effect in other curriculum areas. As a school, we specialise in offering a personalised learning programme and yet children have surprised us with what they're able to achieve through independent learning and exploration. Where we've worried about spending time because of the pressure to cover the National Curriculum, we've now realised that taking the time allows the learning to develop, and children become empowered.

The importance of the textbooks

At first we didn't introduce the textbooks to all year groups because we were concerned about using them, so we took questions and challenges from the book. But as we went through the training we realised that the pupil book was a way of checking that they'd gained the understanding. We use the textbook to model effective practice and how to explore a mathematical concept. But you don't have to just follow the textbook religiously: you and the children are encouraged to explore, and to approach the questions in different ways.

3.5 Barncroft Primary School, Hampshire

SCHOOL INFORMATION

Head Teacher and Deputy Head: Julia Roberts and Liz Dayton

Location: Havant

LA: Hampshire

Pupils on roll: 411

SEN: 22%

EAL: 0%

Pupil Premium on roll: 47.9%

Ofsted: Good

Using *Inspire Maths* since: 2015

Year groups using *Inspire Maths*: 1–4 on a rolling basis

Progress in Maths: -1.2 (2017)

"It's completely changed the children's levels of resilience, and they're far more willing to try things out, and explain their thinking and reasoning. Their enjoyment of maths has improved, and this is partly evident in the reduction in challenging behaviour in maths lessons. ***Our maths lessons are now the calmest session of the day****."*

Background information

Barncroft Primary School is a two-form entry school with classes from Reception to Year 6. It is located in an area of high deprivation: the catchment area is one of the most deprived areas of the country, and is one of the ten most deprived areas in Hampshire. In some classes, nearly 70% of the children attract Pupil Premium. The school has high levels of mobility because many families live in social or temporary housing. The school is also close to a children's home and a women's refuge, which both bring particular challenges. Historically, the school has obtained very low results in both KS1 and KS2. Very few children have achieved the higher levels and reaching the expected standard has been incredibly difficult.

Prior to implementing *Inspire Maths*, Barncroft Primary School was following the National Curriculum and using resources from the Nrich Maths Project where appropriate. They were not using any mastery resources. They began using *Inspire Maths* in 2015, opting to phase it in on a year-by-year basis. KS1 data has improved dramatically, and they confidently expect to see a similar outcome for the KS2 data in the future. Barncroft Primary School use past papers to prepare for national tests. They use assertive mentoring to track progress against the key performance indicators for each year group. Since using *Inspire Maths*, they have been using the beginning, middle and end of year assessments, as well as the formative assessments in the practice books.

Improving results

In 2015, 92% of children in Year 2 achieved Level 2 or above, just below the national average. In 2018, 83% of children are meeting expectations, and 40% are achieving greater depth, both well ahead of the national average[16].

Adopting *Inspire Maths*

Our maths progress and attainment across the school was low. We'd received an Requires Improvement grade from Ofsted, and that was largely down to our teaching and attainment in maths. Maths was a big priority for the

[16] Based on 2017's national average, where 75% of children were meeting expectations, and 23% achieving greater depth (Department for Education, 2017 'National curriculum assessments at key stage 2 in England, 2017 (revised)'

school, and within maths, problem-solving and reasoning were our main concerns. Children were working at a procedural level but didn't have depth of understanding to apply that through variation and reasoning.

We'd heard about a pilot of *Inspire Maths* at our local teaching alliance, and because we were looking for something to improve the quality of our maths teaching, we went along to the initial training session. We were impressed because it wasn't just another scheme: it was a high-quality teaching programme. After the pilot, our outcomes had improved so dramatically that we decided to invest in it.

We were looking for a commercial scheme, but something that was based on research on how children learn. We wanted it to follow the CPA approach, and include lots of reasoning and variation. We were looking for high-quality teaching sequences, which taught concepts to sufficient depth. We wanted it to support the improvement of teaching through high-quality professional development. We wanted to empower our teachers, so it was important it wasn't a "scheme" which teachers just followed and delivered.

The deputy head and Year 1 teacher attended the training, and having made the decision to adopt it, we sent all teachers on the training.

When the school was making the decision to adopt *Inspire Maths*, staff were concerned about the depth of learning required by the programme (and a mastery approach). However, when we looked at the Year 2 National Curriculum, we realised the concerns were around reasoning, problem-solving and depth of learning, which were requirements of the newer and higher expectations of the National Curriculum, which they were conflating with concerns over *Inspire Maths*. Once they realised that, they could see that *Inspire Maths* would help them to meet the new higher expectations of the National Curriculum.

The impact of *Inspire Maths*

Inspire Maths has had an impact on maths results, but also on speaking, listening and language, particularly children's ability to speak in full sentences, and read and interpret information. The textbooks require them to read and comprehend. They have developed their technical language which they can use in science, along with the ability to make predictions and use their reasoning skills. **We can see the impact of *Inspire Maths* across the curriculum**.

Using *Inspire Maths* alongside the National Curriculum

Before going on the training, there was some concern amongst staff about adopting a textbook approach, but on closer inspection, it was clear that the questions in the books were of a higher quality than those being asked by teachers themselves at the time. Historically teachers had spent their Sunday evenings planning questions to use in their teaching, and the questions lacked the variation, progression and multi-representation of the *Inspire Maths* books. When you unpick the questions in *Inspire Maths* you can see how carefully constructed they are in terms of constantly building on prior knowledge and gently moving the children forward. Once the teachers saw that, they were more confident. After the training, **they were bowled over by the programme**, because they realised that the books are just one component of a much wider approach: changing the way that maths is taught, from planning, to the focus on problem solving and reasoning, and the requirement for children to answer in full sentences. They could see the depth of learning that could be accessed through the questions.

It can be surprising that a textbook programme is so strongly driven by a CPA approach; it uses concrete materials more than any other textbook scheme.

Pace and progression

We've definitely reduced the long tail of underachievers, so they are moving forward at the same pace. Those using books from a lower level will have significant learning delays or SEND (special educational needs and disability). For them, we link the units following a "spiral" curriculum, so they still have the same topic, but access it at a lower level. Because the

expectations are so much higher than those for the National Curriculum, we will pause if we feel children need a bit longer to grasp a new concept or skill, knowing we're still meeting the National Curriculum expectations.

The pace *is* appropriate: we only move on when they're ready to move on. It's appropriately challenging.

Supporting children working below and above expectations

Inspire Maths has supported children working below and above age-related expectations very well. Greater depth and fewer topics mean children can achieve better understanding. That means later on they're not trying to remember something they've not really understood. Instead, they have lots of opportunities to apply their learning which ultimately raises attainment.

Inspire Maths has helped those with delays in SLC skills because it follows a CPA approach, so talk is scaffolded through the manipulatives and pictorial representations. From that, they move to the abstract, whereas before they were going straight to the abstract.

Children who need to catch up are given one-to-one support using the Inspire Maths resources because these are the best quality resources available, and to maintain consistency.

Interventions

The language fluency is driven by the need to be able to explain their reasoning: if they can't talk about why they've done something, it's hard for us to see their strengths and gaps, so we can assess them and address misconceptions or gaps.

The school has introduced an afternoon "maths meeting" and this is used to reinforce the content of the morning's lesson for those who haven't quite got it, and to stretch those who need the greater challenge. The higher attainers use the assessment books, and the maths journals to allow working at greater depth.

Because the *Inspire Maths* lessons enable teachers to get the same quality learning in forty minutes as they used to get in an hour, this time is allocated to the afternoon session. Overall, there hasn't been an increase in the timetabled allowance for maths, but it's just structured differently.

Supporting teachers

Because the quality of the professional development is so good, all the teachers who've attended it have moved on in their practice. The NQTs have said that they've learned more on the *Inspire Maths* course than in their ITT (initial teaching training), while the confident teachers have revisited some of their assumptions about teaching maths and reflected on their practice. Staff's technical vocabulary and understanding of maths language has come on significantly.

The training was fundamentally important because it's the quality of the CPD that's underpinned the success and effectiveness of the programme. Without it, our teaching and results wouldn't have been transformed. OUP were very supportive. The CPD is over five days, spread out over the first year so that you can interweave the training with starting to use the programme, which means that you're supported in the first year of using it.

Anytime we get in touch they're quick to respond. We aren't a typical school, and OUP have come up with advice which is specific to our needs.

The school's maths strategy

Our strategy is for all children to attain their potential in maths, to be confident and capable so that they can progress to the next stage in their education, and for all to receive high-quality teaching in maths for the duration of their time at the school.

Planning and teaching

We've completely changed our planning format to follow the *Inspire Maths* plans, and we've changed our approach to assessment. In planning, adopting *Inspire Maths* had meant **teachers are more focused on reasoning, variation and children really showing depth of understanding and secure knowledge**,

rather than focusing on procedural learning which was driven by curriculum coverage. That meant that children could get away with surface learning without being able to use and apply their learning.

Teachers don't just follow the teaching guides: they add to and annotate the plans to reflect the needs of their children. It's definitely reduced the time spent on planning and means there's greater consistency across the year groups.

We follow the sequence as closely as we can, to ensure we benefit from the consistency. The scheme is very well planned and ordered.

It's been very straightforward to use the resources; the training was very useful in this. We believe the programme has reduced teachers' workload.

The curriculum doesn't give an exact year-to-year match, but offers a progression through the books. So although we're very clear that book 1 doesn't mean Year 1, the expectations are so much higher it's better to follow the structure of the programme because you know that children are exceeding the expectations of the National Curriculum. For example, some of the Year 3 children are using the Year 2 books, but we know that they're still meeting the National Curriculum expectations.

Initially we looked at changing the order in Year 2 to prepare for SATs, but because the expectations are so much higher, we know that by May in Year 2, children are already achieving the National Curriculum expectations.

Supporting a mastery approach

It's completely changed children's levels of resilience, and they're far more willing to try things out, and explain their thinking and reasoning. **Their enjoyment of maths has improved, and this is partly evident in the reduction in challenging behaviour in maths lessons. Our maths lessons are now the calmest session of the day**.

We like that *Inspire Maths* focuses on the pedagogy and is based on research on how children learn, particularly with regards to educational theory underpinning the CPA approach.

Ultimately, I don't see *Inspire Maths* as a scheme, I see it as a high-quality teaching programme. It fills the gap left by ITT which puts less and less focus on how children learn and understanding their needs.

For less – and more – confident teachers it shows them how to deliver a spiral curriculum, teaching the right things at the right time.

The importance of the textbooks

The textbooks are important and we are increasing our use of these, and of course extending the programme up into Year 6. We're expecting that once we have our first set of results with *Inspire Maths* we'll see the same improvements as those we've already seen at KS1.

4 Acknowledgements

Our thanks to all the schools and teachers who contributed to these case studies, for their enthusiastic adoption of the resources, and for their willingness to share their experiences here.

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INSPIRE MATHS

Getting Started Guide 2

Inspire Maths is a transformational, whole-school primary maths programme based on the leading Singapore Maths series My Pals Are Here! Recognised globally as one of the most impactful ways to teach and learn maths, Inspire Maths builds firm foundations and a deep understanding of mathematical concepts through a concrete-pictorial-abstract approach.

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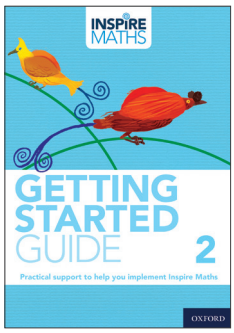

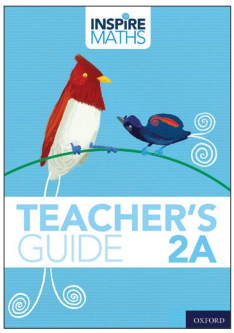

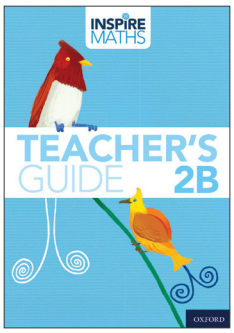

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- Further support for successful implementation
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- Guidance on the importance of high-quality textbooks and high achievement in mathematics

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How to get in touch:
web www.oxfordprimary.co.uk
email primary.enquiries@oup.com
tel. +44 (0) 1536 452610
fax +44 (0) 1865 313472

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