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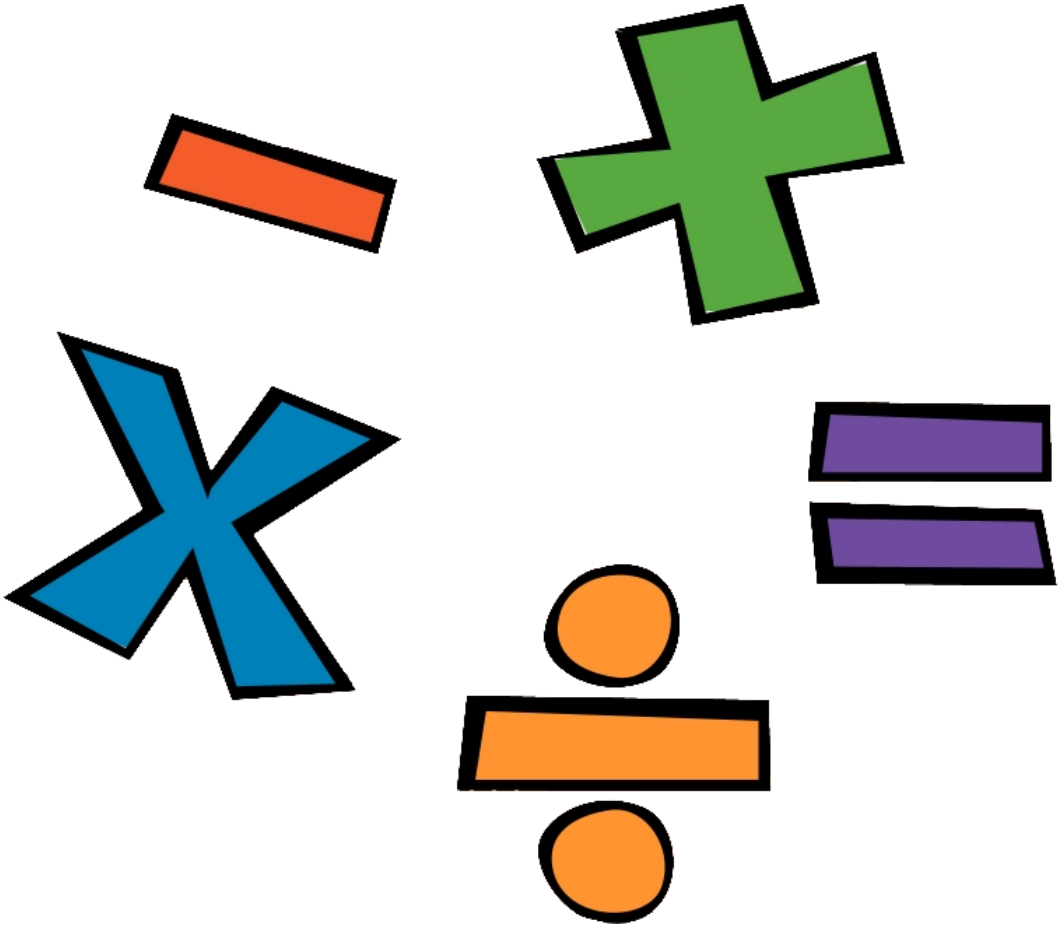
Mathematics Subject Leaders Resource File



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Mathematics Subject Leaders Resource File

This, and subsequent resource files have been designed specifically to support the work of subject leaders in Primary Schools who have responsibility for any of the following subjects: Art & Design; Computing; Design & Technology; English; Geography; History; Mathematics; MfL; Music; PE; PSHE, RE and Science. The structure of each resource file follows the same format:

To support the work of a subject leader, there is a subject specific work-book for you to keep a record of all of the actions you have taken as well as the impact / outcome of those actions.

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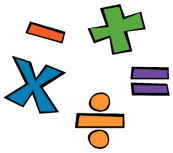
Mathematics Subject Leaders Work-Book



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Part A: Resources & NC Requirements

Links
Association of Teachers of Mathematics
https://www.atm.org.uk/
(Membership: School: £60 / annum – Individual: £60 / annum)

Professional Association for Teachers of Mathematics
https://www.m-a.org.uk/

STEM
https://www.stem.org.uk/

National Centre for Maths Hub
https://www.ncetm.org.uk/hubs/london-central-and-west-maths-hub/

Mathematics can be used to describe, to illustrate, to interpret, to predict and to explain. Above all it is used to convey meaning. If pupils cannot interpret the result of a mathematical task then it has had little value for them: if they can perform successfully a multiplication involving two numbers but are unable to say, if challenged, when that operation might be used, or to say whether the answer is a reasonable one or not, then there is something seriously wrong. The main reason for teaching mathematics is its importance in the analysis and communication of information and ideas. The mere manipulation of numerical or algebraic symbols is of secondary importance.

A tool enables things to be done which it might otherwise be impossible or difficult to do, or to do as well. Mathematics is such a tool. Many instances arise in the school curriculum, in working life and in society generally where mathematics is used as a tool in a variety of ways. Viewed from this perspective it is not the mathematics itself but the result obtained which is the important thing. The result might be a design in art, a model in craft, an analysis of an experiment in science, the checking of a shopping bill, the planning of a holiday, or the construction of a motorway and it is in that outcome that the interest lies. Skills such as measuring length, telling the time, constructing a graph, drawing geometric shapes, dividing one number by another and solving an equation are not important ends in themselves and only become so as they are embedded in purposeful activities.

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Mathematics programmes of study: key stages 1 and 2

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/335158/PRIMARY_national_curriculum_-_Mathematics_220714.pdf

The national curriculum for mathematics aims to ensure that all pupils:

♣ 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.

♣ reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

♣ 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.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

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.

Key stage 1 – years 1 and 2

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower key stage 2 – years 3 and 4
The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Upper key stage 2 – years 5 and 6
The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed

in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

Key stage 1 mathematics teacher assessment framework
Teachers should follow the guidance for using this mathematics framework set out in the complete teacher assessment frameworks.

Working towards the expected standard
The pupil can:

- read and write numbers in numerals up to 100
- partition a two-digit number into tens and ones to demonstrate an understanding of place value, though they may use structured resources1 to support them
- add and subtract two-digit numbers and ones, and two-digit numbers and tens, where no regrouping is required, explaining their method verbally, in pictures or using apparatus (e.g. 23 + 5; 46 + 20; 16 – 5; 88 – 30)
- recall at least four of the six 2 number bonds for 10 and reason about associated facts (e.g. 6 + 4 = 10, therefore 4 + 6 = 10 and 10 – 6 = 4)
- count in twos, fives and tens from 0 and use this to solve problems • know the value of different coins
- name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (e.g. triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres).

1 For example, base 10 apparatus.
2 Key number bonds to 10 are: 0+10, 1 + 9, 2 + 8, 3 + 7, 4 + 6, 5 + 5.

Working at the expected standard
The pupil can:

- read scales* in divisions of ones, twos, fives and tens
- partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus
- add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17)
- recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If 7 + 3 = 10 then 17 + 3 = 20; if 7 – 3 = 4

then 17 – 3 = 14; leading to if 14 + 3 = 17, then 3 + 14 = 17, 17 – 14 = 3 and 17 – 3 = 14)
- recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary
- identify —1 4 , —1 3 , —1 2 , —2 4 , —3 4 , of a number or shape, and know that all parts must be equal parts of the whole
- use different coins to make the same amount
- read the time on a clock to the nearest 15 minutes
- name and describe properties of 2-D and 3-D shapes, including number of sides, vertices, edges, faces and lines of symmetry.

* The scale can be in the form of a number line or a practical measuring situation.

Working at greater depth

The pupil can:

- read scales* where not all numbers on the scale are given and estimate points in between
- recall and use multiplication and division facts for 2, 5 and 10 and make deductions outside known multiplication facts
- use reasoning about numbers and relationships to solve more complex problems and explain their thinking (e.g. 29 + 17 = 15 + 4 + ¨ ; 'together Jack and Sam have £14. Jack has £2 more than Sam. How much money does Sam have?' etc) • solve unfamiliar word problems that involve more than one step (e.g. 'which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?')
- read the time on a clock to the nearest 5 minutes
- describe similarities and differences of 2-D and 3-D shapes, using their properties (e.g. that two different 2-D shapes both have only one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices, but different dimensions).

* The scale can be in the form of a number line or a practical measuring situation

See also: Mathematics guidance: key stages 1 and 2 Non-statutory guidance for the national curriculum in England
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/897806/Maths_guidance_KS_1_and_2.pdf

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Part B: Subject leaders audit: Mathematics

Task	Notes	Completed	Date
Am I clear about the N.C. Aims for Mathematics?			
Have I checked out the subject association website to identify resources for: * Me, as the subject leader * Teachers / assistants			
Have I completed an audit of my own K, S & U against these aims?			
Have I identified sources to support me in my own subject knowledge?			
Have I written a statement of Intent for Mathematics?			
In writing the statement of Intent, did I refer to paragraph 179 of D-D Resource 1?			
Re: Para: 179, do I have a written response for each of the 5 bullet points?			
Has this statement been approved by HT / SLT / all staff?			
Have I developed a monitoring calendar so that I am able to build up an accurate and up-to-date overview of the www/ebi in T, L & A for Mathematics?			
Have I clarified with my line manager what good / better T, L & A in Mathematics 'looks' like? (and hence what is not yet 'good' enough)			
Supplementary questions:			
How long have I been the subject leader for Mathematics, and what support (CPD) have I received either internally or externally?			

What resources do I use to support me as a subject leader?			
How have I designed the Mathematics curriculum?			
What am I trying to achieve through the Mathematics curriculum?			
What scheme of learning does the school follow (published or your own)?			
How is this subject taught, and why?			
How do children progress in this subject from one year to the next? *(Remember that **progress is knowing more, remembering more and being able to do more**.)*			
How do you ensure that pupils retain their subject knowledge?			
How do you ensure that pupils with SEND (as well as those entitled to Pupil Premium) benefit from the curriculum in this subject?			
What would you expect an inspector to see when they visit Mathematics lessons and speak to the pupils?			
How do teachers clarify any misconceptions by pupils?			
What links are made between Mathematics and other subjects does – can you give an example of where this works particularly well?			
Can you tell of any examples where you have supported other teachers / assistants in subject X and the impact that this has had on their teaching / pupils' learning?			

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Part C: Initial subject self-evaluation proforma Date:

This is a basic self-evaluation proforma in order for the subject leader to gain a brief overview of strengths and areas for improvement possibly prior to undertaking a more comprehensive review and monitoring process.

Summary
The key strengths in:
Teaching, learning & assessment in Mathematics are:
The Mathematics Curriculum are:
The main areas we need to develop in:
Teaching, learning & assessment in Mathematics are:
The Mathematics curriculum are:

Signed: …….. **Date:** ……

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Part D: Progress in Mathematics

EYFS

- Develop fast recognition of up to 3 objects, without having to count them individually ('subitising').
- Recite numbers past 5.
- Say one number for each item in order: 1,2,3,4,5.
- Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').
- Show 'finger numbers' up to 5.
- Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.
- Experiment with their own symbols and marks as well as numerals.
- Solve real world mathematical problems with numbers up to 5.
- Compare quantities using language: 'more than', 'fewer than'.
- Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'.
- Understand position through words alone – for example, "The bag is under the table," – with no pointing.
- Describe a familiar route.
- Discuss routes and locations, using words like 'in front of' and 'behind'.
- Make comparisons between objects relating to size, length, weight and capacity.
- Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc.
- Combine shapes to make new ones – an arch, a bigger triangle, etc.
- Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs', etc.
- Extend and create ABAB patterns – stick, leaf, stick, leaf.
- Notice and correct an error in a repeating pattern.
- Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'
- Count objects, actions and sounds.
- Subitise
- Link the number symbol (numeral) with its cardinal number value.
- Count beyond ten.
- Compare numbers.
- Understand the 'one more than/one less than' relationship between consecutive numbers.

- Explore the composition of numbers to 10.
- Automatically recall number bonds for numbers 0–5 and some to 10.
- Select, rotate and manipulate shapes to develop spatial reasoning skills.
- Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.
- Continue, copy and create repeating patterns.
- Compare length, weight and capacity.

KS1 & 2 guidance:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1017683/Maths_guidance_KS_1_and_2.pdf

See, in particular, pages 9 – 15.

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Part E: Best practice as identified by Ofsted

In this section, I make reference to:

- **Ei:** The main findings / recommendations from 'Coordinating mathematical success: the mathematics subject report'. Ofsted (July 2023) https://www.gov.uk/government/publications/subject-report-series-maths/coordinating-mathematical-success-the-mathematics-subject-report
- **Eii**: the 2021 Ofsted research report: https://www.gov.uk/government/publications/research-review-series-mathematics/research-review-series-mathematics
- **Eiii:** the last 'triennial' report (2011) that Ofsted wrote about Mathematics in Primary & Secondary schools This report provides numerous examples of what were described as best practice in teaching & learning in Mathematics in primary schools. They provide excellent examples for sharing out amongst class teachers as well as for subject leaders to audit their school's provision against.

Part Ei: Coordinating mathematical success: the mathematics subject report. Ofsted (July 2023)

https://www.gov.uk/government/publications/subject-report-series-maths/coordinating-mathematical-success-the-mathematics-subject-report

(Suggested questions to respond to are writing in red)

Context

Mathematics is a universal language that helps us to understand the world, and it is a core part of the curriculum. As well as teaching about numbers, shapes, statistics and patterns, it provides important tools for work in areas such as physics, architecture, medicine and business. It helps learners to develop logical and methodical thinking, to focus and to solve a wide range of mathematical problems. Success can be 'coordinated' when leaders ensure all the elements of pupils' mathematics education are supporting each pupil's progress in the subject. Success in mathematics leads to many opportunities for further study and employment. Mathematics is a core subject of the national curriculum. It is an important entitlement for all pupils in England's schools: academies, free schools and maintained schools.

Although pupils in England, on average, perform better in mathematics than pupils in many other countries, there is a large gap between the lowest and highest achievers, and between disadvantaged and advantaged pupils. Studies and media reports continue to show that there is a shortage of specialist mathematics teachers and that this is a longstanding issue found in other countries.[footnote 1]

This report evaluates the common strengths and weaknesses of mathematics in the schools inspected and considers the challenges that mathematics education faces. The evidence was gathered by His Majesty's Inspectors as part of routine inspections. The report follows our mathematics research review published in 2021, which sets out our idea of a high-quality mathematics education. The report is split into findings in primary schools and those in secondary schools, and includes evidence from Reception classes and sixth forms. Within each of these sections, we talk about:

- aspects of the curriculum
- pedagogy
- assessment
- the way schools are organised
- the impact of this on what pupils learn

It is important to note that we evaluate schools against the criteria in the school inspection handbooks. Findings from this report will not be used as a 'tick list' by inspectors when they are inspecting schools: we know that there are many different ways that schools can put together and teach a high-quality mathematics curriculum.

During the period of evidence-gathering, schools were facing many challenges because of COVID-19. As other studies have shown, pupils have been affected by remote learning, lockdowns and national restrictions. Therefore, some of the evidence gathered for this report may not represent 'business as usual'. However, by focusing on the curriculum and its implementation over time, we hope that this risk has been reduced.

Key terms used in this report

Knowledge in mathematics

Throughout this report, we use the same terminology for mathematics knowledge as we used in our mathematics research review. These are not necessarily terms that Ofsted would expect pupils or teachers to use:

- declarative knowledge: facts, concepts, formulae
- procedural knowledge: methods, procedures, algorithms
- conditional knowledge: strategies formed from the combinations of facts and methods to reason and problem-solve

Main findings

Primary schools

- In the last few years, a resounding, positive shift in mathematics education has taken place in primary schools. Curriculum is now at the heart of leaders' decisions and actions. Generic approaches, such as the expectation that all teaching should always be differentiated, have dissipated. We now see high quality curriculums, collaborative support for teachers and a focus on mathematics teaching. Leaders intend that pupils 'keep up, not catch up'. These approaches set out a better path to proficiency for pupils.

- Teachers help pupils to understand new concepts. Networks of support, such as the Maths Hubs, provide regular and highly useful training. This helps teachers to adopt new and improved ways of explaining and modelling concepts. Often, teachers use physical resources and pictorial representations to help pupils see underlying mathematical structures. They also teach and model new vocabulary, regularly check pupils' understanding and swiftly pick up misconceptions.

- There are some deficiencies in the quality and quantity of practice that pupils undertake. Even when teachers teach with clarity and precision, it is likely that these deficiencies undermine pupils' ability to remember important knowledge. For older pupils, these deficiencies affect their ability to attain procedural fluency (speed and accuracy).

- Pupils' gaps in knowledge tend to be centred around, but not limited to, addition facts in younger year groups. This was for some, but not all pupils. These early gaps in knowledge may not become apparent until a significant amount of time has elapsed. This is because it is possible, in the medium term, for pupils to understand what is being taught and then keep up with extra classroom support and slower calculation. However, this is at the expense of later ability to access the curriculum.

- Accountability measures and wide spreads of attainment tend to influence leaders' decision making and resource allocation for Year 6 cohorts. Allocating additional resources to year 6 leaves leaders with fewer resources to invest in pupils' earlier education. Further, a goal of true proficiency is superseded by 'age related expectations' which roughly equates to 50% accuracy in end of key stage tests. As a result, many pupils aren't as prepared for the rigours of secondary education as they could be.

Discussion of the findings

The overall picture of mathematics education in England is broadly healthy. This positive picture did not arise through chance but through the commitment of school leaders, teachers and members of the mathematics subject community.

Leaders prioritise creating or adopting a high-quality mathematics curriculum. They give careful and ongoing consideration to the effective teaching of that curriculum. Leaders make good use of support and resources from Maths Hubs, the National Centre for Excellence in the Teaching of Mathematics (NCTEM) and from commercial providers. As a result, many teachers receive high quality, subject-specific continual professional development (CPD) and there are flourishing formal and informal networks of teaching professionals.

This is a significant shift compared to when Ofsted's last mathematics subject report, Made to Measure, noted that 'very few schools provided curricular guidance for staff, underpinned by professional development that focused on enhancing subject knowledge and expertise in the teaching of mathematics, to ensure consistent implementation of approaches and policies'.

Given this very positive picture, this report explores the features of this widespread effective practice to support its replication. This report also considers the factors which might explain the continued weaknesses in outcomes for some children.

The phrase 'coordinating mathematical success' describes how effective schools make sure that curriculum plans, teaching approaches, pupil tasks, assessments and mechanisms for evolving these align well. When successful, each individual element is of high quality, and the elements work in harmony, together supporting pupils to learn effectively. It means setting out a path to proficiency in the subject, checking pupils are on that path and helping them to stay on that path.

Many of the features of the conception of quality, as outlined in our research review, are prevalent in the schools visited. For example, curriculum sequencing that includes 'small steps' approaches towards increasing mathematical proficiency, teaching that helps pupils to understand, and carefully curated opportunities to practise. In most schools, teachers routinely assess whether pupils have the necessary prior knowledge to undertake new learning. Primary school teachers quickly identify misconceptions, including through computerised tests.

However, it was when each element of mathematics education was of high quality, and those elements worked together, that pupils learnt most

effectively. A centralised approach, with a carefully sequenced curriculum at its core, also supports schools faced with higher teacher turnover and/or teachers with less experience and subject knowledge. Even in schools without these challenges, teachers' shared understanding of curriculum progression and high-quality teaching contributes to high quality mathematics education.

It is now common for teachers, in both primary and secondary schools, to receive regular subject-specific professional development. In primary schools, this support is often provided through Maths Hubs and is put in place by leaders who have a clear focus on developing teachers' subject-specific teaching knowledge. Leaders' strong understanding of high-quality mathematics education tends to be reflected in their monitoring foci. In secondary schools, it is much more common for professional development to take the form of departmental meetings that focus on curriculum design and effective curriculum practice.

In schools with less experienced or non-specialist teachers, there is a need to develop a shared understanding of curriculum progression and features of effective practice. Schools with more experienced subject-specialist staff engage in professional debates about how to teach aspects of the mathematics curriculum most effectively. Schools where mathematics provision is strongest ensure that other adults working with pupils, including teaching assistants and tutors, understand the curriculum and its implementation. Where these other adults do not have this shared understanding, the effectiveness of their support is limited.

There are examples in some schools of less successful practices. At primary level inspectors encountered curriculums that lack specified detail in the Reception Year, that allocate geometry to the summer term only or do not provide for enough learning of conditional knowledge. Sometimes questioning causes pupils to guess rather than recall. In other cases, multiple representations cause confusion rather than clarity.

In some schools, towards the end of primary and secondary phases, the focus of assessment shifts away from identifying pupils' needs and moved towards exam or test preparation. This phenomenon is often coupled with an increase in resources to provide for interventions and, in primary schools, reduced class sizes. The need for significant 'last-minute' intervention in some schools suggests deficiencies in the curriculum, teaching or rehearsal earlier on in pupils' mathematical education.

In some schools, the choice of mathematical methods taught is left to individual teachers' preferences rather than taken as a broader curriculum decision. This means that the approaches that are taught may only be useful to answer questions of the precise type identified in the curriculum for a particular year or key stage. The opportunity to engineer success over time is lost and pupils in these schools typically develop what can be characterised as 'disconnected pieces of knowledge'.

Pupil practice is sometimes limited in quality and quantity in both primary and secondary schools. This happens when leaders see practice as an activity, rather than focusing on its outcomes – whether pupils have practised until they have learned, to automaticity, the intended mathematical knowledge. There is often no consensus among leaders about benchmarks for optimal quality and quantity of practice that gives assurance that pupils have learned what is intended.

An ambitious curriculum is one that maximises the mathematics that pupils learn. In some schools, teachers move on before ensuring pupils have learned important knowledge and committed that knowledge to long term memory. In schools where this is common, leaders focus on what pupils study, rather than on what pupils learn. Moving on when pupils are not mathematically ready gives the illusion of progress but creates ever greater gaps that will take more time to address in the future. Some leaders gain false assurance about the effectiveness of their curriculum design and practice through internal assessments that closely align with ‘expected performance thresholds’ of external assessments. This approach often leads to an acceptance of pupils moving through the mathematics curriculum with significant gaps in their knowledge and leaders failing to make necessary adjustments to their curriculums. In these schools, some pupils would be better served by studying less, but securely learning more.

Curriculum thinking about problem-solving and reasoning differs between primary and secondary schools. Pupils need to learn strategies and the most useful combinations of facts and methods to solve types of problem. Since it is not possible for pupils to encounter every possible problem, a suitable curriculum can identify strategies to solve an identified range of problem types. In some primary schools, pupils self-selected the problems they will solve and in many secondary schools there is a lack of curriculum planning to ensure all pupils encounter a range of problem types and have practice solving these problems. In some cases, pupils have little or no opportunity to use the mathematical knowledge they have to reason mathematically or solve problems. This is especially an issue for pupils who find learning mathematics more challenging.

Recommendations
Curriculum

All schools should make sure that:

- curriculums emphasise secure learning of, rather than encountering, mathematical knowledge.

Q: Can you share examples of how teachers ensure that their respective planning shows how (and then provide evidence of) pupils are developing their mathematical skills, knowledge and understanding?

- curriculum sequencing prepares pupils for transitions between key stages and phases

Q: Can you provide an example (or two) of how pupils learning of the different strands of Mathematics is developed from one unit to the next?

Primary schools should make sure that:

- they identify and sequence small steps in the Reception Year curriculum

Q: Can you provide examples from your curriculum plans that these are addressed and that evidence indicates the progress that the children are making?

- all pupils learn to apply facts and methods to wider problem-solving

Q: Can you provide evidence from your monitoring of how pupils use problem-solving to apply the facts and methods that they have been learning?

- geometry knowledge is sequenced throughout, rather than at the end of, each year's curriculum.

Q: Can you provide evidence from your curriculum plans of how / where / when / why pupils learn geometry?

Pedagogy and assessment

All schools should:

- make certain that teachers routinely check whether pupils have secure knowledge and understanding of prerequisite mathematics and address any gaps identified, before moving on to the next stage of learning

Q: How are you ensuring a) that all teachers know precisely what pupils need to be learning through the various mathemtics units and b) that tasks / assessments are designed to enable pupils to demonstrate this?

- make sure that teachers regularly connect new learning to what pupils have learned before, including showing pupils how it connects with learning in other subjects

Q: Can you demonstrate from curriculum planning and monitoring of learning that pupils are able to make connections both within mathematics and with other subjects?

- make sure that all pupils practise and consolidate new learning through well-designed exercises and activities, including sequences of problem-solving

Q: ditto above - Can you provide evidence from your monitoring of how pupils use problem-solving to apply the facts and methods that they have been learning?

- check that pupils are developing 'procedural fluency' (speed and accuracy of recall of methods) and address gaps in pupils' procedural knowledge at the earliest possible opportunity

Q: Are you able to provide evidence from your monitoring of how pupils are developing their 'procedural fluency' and that teachers promptly address any gaps they may have?

Primary schools should:

- consider using routines, keeping noise levels low and making sure that pupils are facing the teacher when they are explaining new content and giving instructions, to help them focus on what is being taught

Q: Do you have evidence from the school's monitoring that the above is routine practice?

- help younger pupils to learn their addition facts by heart and regularly check their recall of this knowledge

Q: Do you have evidence from the school's monitoring that the above is routine practice?

- reflect on the extent to which additional afternoon practice is due to deficiencies in the early curriculum and its implementation

Q: Do you have evidence from the school's monitoring whether the above is true or not?

- aim for pupils to become proficient and ready for Year 7, rather than just meet age related expectations for end of key stage tests

Q: Do you have any links with 'feeder' secondary schools to ensure that all pupils are Y7 ready and how is this information shared with colleagues?

- make sure that questioning helps all pupils to recall and make connections, rather than allowing pupils to guess

Q: What CPD has been delivered to colleagues re: questioning, to sharpen the responses from pupils?

- provide pre-teaching, additional teaching and extra practice for most pupils with special educational needs and/or disabilities (SEND)

Q: How are pupils with additional educational needs supported with their learning in mathematics and what is the impact of this support?

Systems at subject and school level

All schools should:

- provide continuing professional development for teaching assistants, and other adults working with pupils, to help them to understand the intended school mathematics curriculum and the way it is put into practice

Q: What CPD are you delivering / directing colleagues to in order to enhance their subject knowledge and what impact is this having on pupils learning in mathematics?

Primary schools should:

- make sure that discussions with leaders about progress specifically address the needs of the lowest attaining younger pupils

Q: Are you able to provide any evidence from either monitoring activities or line management meetings with SLT where this is addressed?

- aim to prioritise resourcing for younger year groups, to better engineer success from the start of a pupil's mathematics journey

Q: Do you have any evidence to indicate that the school has addressed this?

- when leaders observe lessons, focus on pupils' thinking and the quality and quantity of practice they undertake

Q: Can you give an example(s) from the monitoring (pupil voice / learning explorations) of pupils learning which demonstrates a focus on their learning / practice of mathematical skills and not just 'teaching'?

Part Eii: Research review series: Mathematics (May 2021)

https://www.gov.uk/government/publications/research-review-series-mathematics/research-review-series-mathematics#conclusion

This review explores the literature relating to the field of maths education. Its purpose is to identify factors that can contribute to high-quality school maths curriculums, assessment, pedagogy and systems. We will use this understanding of subject quality to examine how maths is taught in England's schools from Reception onwards. We will then publish a subject report to share what we have learned.

Since there are a variety of ways that schools can construct and teach a high-quality maths curriculum, it is important to recognise that there is no singular way of achieving high-quality maths education.
In this review, we have:

- outlined the national context in relation to maths
- summarised our review of research into factors that can affect quality of education in maths
- considered curriculum progression in maths, pedagogy, assessment and the impact of school leaders' decisions on provision

The review draws on a range of sources, including our 'Education inspection framework: overview of research' and our 3 phases of curriculum research.

Summary
This review identifies that, despite English pupils achieving, on average, higher attainment than pupils in many other countries, the attainment gap between low and high achievers in England is wide. Therefore, in addition to shining a light on approaches that could raise the attainment of all pupils still further, a core theme of this review is how we might prevent struggling pupils from falling further behind their peers.

The review classifies mathematics curriculum content

For this review, we have classified mathematical curriculum content into **declarative**, **procedural** and **conditional** knowledge.

Declarative knowledge is static in nature and consists of facts, formulae, concepts, principles and rules.

All content in this category can be prefaced with the sentence stem '***I know that'.***

Procedural knowledge is recalled as a sequence of steps. The category includes methods, algorithms and procedures: everything from long division, ways of setting out calculations in workbooks to the familiar step-by-step approaches to solving quadratic equations.

All content in this category can be prefaced by the sentence stem '***I know how'.***

Conditional knowledge gives pupils the ability to reason and solve problems. Useful combinations of declarative and procedural knowledge are transformed into strategies when pupils learn to match the problem types that they can be used for.

All content in this category can be prefaced by the sentence stem '***I know when'.***

When pupils learn and use declarative, procedural and conditional knowledge, their knowledge of relationships between concepts develops over time. This knowledge is classified within the 'type 2' sub-category of content (see table below). For example, recognition of the deep mathematical structures of problems and their connection to core strategies is the type 2 form of conditional knowledge.

Summary table of content categories considered in the review

Category	Type 1	Type 2
Declarative 'I know that'	Facts and formulae	Relationship between facts (conceptual understanding)
Procedural 'I know how'	Methods	Relationship between facts, procedures and missing facts (principles/mechanisms)
Conditional 'I know when'	Strategies	Relationship between information, strategies and missing information (reasoning)

The above report identifies a number of features which it states as: ***'High-quality maths education may have the following features":***

For the subject leader – it 'may' prove beneficial to work through each theme: e.g. Curriculum progression; organising knowldge etc one at a time, assessing your school's own practice against what Ofsted have identified in this report. ***(see pages xx - xx below)***

High-quality maths education may have the following features

High-quality maths education may have the following features
Curriculum progression: the planned and purposeful journey to expertise:

- *Successful curriculum progression is planned from the beginning of a pupil's education through focusing on core content, to develop pupils' motivation and to allow more breadth and depth later.*
- *The planned curriculum details the core facts, concepts, methods and strategies that give pupils the best chance of developing proficiency in the subject.*
- *The teaching of linked facts and methods is sequenced to take advantage of the way that knowing facts helps pupils to learn methods and vice versa.*
- *Sequences of learning allow pupils to access their familiarity with the facts and methods they need in order to learn strategies for solving problem types.*

High-quality maths education may have the following features
Curriculum sequencing: declarative knowledge:

- *Teachers engineer the best possible start for pupils by closing the school-entry gap in knowledge of the early mathematical code: facts, concepts, vocabulary and symbols.*
- *Pupils are taught core facts, formulae and concepts that are useful now and in the next stage of education.*
- *Teachers help pupils develop their automatic recall of core declarative knowledge, rather than rely on derivation, guesswork or casting around for clues.*

High-quality maths education may have the following features
Curriculum sequencing: procedural knowledge:

- *Teachers teach younger pupils non-distracting and accurate mathematical methods that encourage them to use recall over derivation.*
- *Teachers plan to teach older pupils efficient, systematic and accurate mathematical methods that they can use for more complex calculations and in their next stage of learning.*
- *Teachers help pupils to use these methods to see new connections of number, geometry and time.*
- *Teachers encourage pupils to use core mathematical methods rather than resort to guesswork, cast around for clues or use unstructured trial and error.*

High-quality maths education may have the following features
Curriculum sequencing: procedural knowledge:

- *Teachers teach useful, topic-specific strategies to pupils, as well as how to match them to types of problem.*
- *Pupils are confident using linked facts and methods that are the building blocks of strategies, before strategies are taught.*
- *Teachers encourage pupils to use core, systematic strategies rather than resorting to guesswork or unstructured trial and error.*

High-quality maths education may have the following features
Curriculum sequencing: meeting pupils needs:

- *New content draws on and makes links with the content that pupils have previously acquired.*
- *Curriculum progression is by intelligent design rather than by choice or chance.*
- *Rehearsal sequences align with curriculum sequences.*
- *Pupils who are more likely to struggle or who are at risk of falling behind are given more time to complete tasks, rather than different tasks or curriculums, so that they can commit core facts and methods to long-term memory.*

High-quality maths education may have the following features
Pedagogy: new learning:

- *Teachers remember that it is not possible for pupils to develop proficiency by emulating expertise, but by emulating the journey to expertise.*
- *Systematic instructional approaches to engineer success in learning are incorporated into all stages and phases.*
- *Teachers aim to impart core content in alignment with the detail and sequence of the planned curriculum.*
- *Teachers help pupils to avoid relying on guesswork or unstructured trial and error.*

High-quality maths education may have the following features
Pedagogy: consolidating learning:

- Educators plan to give pupils opportunities to consolidate learning that:
    - go beyond immediately answering questions correctly
    - involve overlearning
    - align with the detail and sequence of the curriculum
    - are free of distraction and disruption
    - strike a balance between type 1 and type 2 practices
    - avoid creating a reliance on outsourced memory aids or physical resources
    - help pupils to avoid relying on guesswork, casting around for clues or the use of unstructured trial and error

High-quality maths education may have the following features
Assessment:

- *Pupils are well prepared for assessments through having learned all the facts, methods and strategies that are likely to be tested.*
- *Teachers plan frequent, low-stakes testing to help pupils to remember content.*
- *Lessons incorporate timed testing to help pupils learn maths facts to automaticity.*

High-quality maths education may have the following features
Systems at the school level:

- *School-wide approaches to calculation and presentation in pupils' books.*
- *School-wide approaches to providing time and resources for teachers to develop subject knowledge and to learn valuable ways of teaching from each other.*

Conclusion

Throughout the review, the theme of engineering success, underpinned by systems thinking, predominates. These approaches seek to transform an offer of content into more of a guarantee that content can and will be learned. The outcomes of this systems thinking are the observed features and approaches of successful mathematics education:

- detailed codification and sequencing of the facts, methods and strategies that pupils will acquire
- instructional coherence and aligned rehearsal that increase the chances of understanding and remembering while minimising the need for guesswork or trial and error.

Within these powerful mathematics education systems, the textbooks, teacher guides and workbooks are seen as a vital part of the infrastructure for efficiently transmitting subject knowledge and subject-pedagogical knowledge to new generations of pupils and teachers. This signals a need for teachers and leaders to avoid installing features and approaches in the absence of the 'infrastructure' underpinning their efficacy. It is also likely that the features that tend not to be observed or selected, such as the less glamorous quality and quantity of practice, are also integral to the overall success of novice mathematicians.

Quality and quantity of practice is a vital key that unlocks the development of dual tracks of conceptual understanding and procedural fluency. Further, in observing pupils' relative expertise and proficiency, such as in a problem-solving lesson, teachers and leaders should be mindful of the journey that pupils took to achieve problem-solving proficiency. This journey will have involved more than the features and activities of the lessons that proficient mathematicians are taking part in at the time. Variation in the quality of mathematics education in England is likely to be the result of the absence of

systems and systems thinking, as well as possible gaps in content, instruction, rehearsal, assessment and the plans for their evolution over time.

Part Eiii: Best practice as identified by Ofsted (2012)

The last time Ofsted reported specifically on Mathematics (2013) they stated that:

This report provides numerous examples of what were 'recently' described as best practice in teaching & learning in Mathematics in primary schools. They provide excellent examples for sharing out amongst class teachers as well as for subject leaders to audit their own school's provision against.

The last time Ofsted reported specifically on Mathematics (2012)[1] they stated that: Schools should:

- tackle in-school inconsistency of teaching, making more good or outstanding, so that every pupil receives a good mathematics education
- increase the emphasis on problem solving across the mathematics curriculum
- develop the expertise of staff:
    - in choosing teaching approaches and activities that foster pupils' deeper understanding, including through the use of practical resources, visual images and information and communication technology
    - in checking and probing pupils' understanding during the lesson, and adapting teaching accordingly
    - in understanding the progression in strands of mathematics over time, so that they know the key knowledge and skills that underpin each stage of learning
    - ensuring policies and guidance are backed up by professional development for staff to aid consistency and effective implementation
- sharpen the mathematical focus of monitoring and data analysis by senior and subject leaders and use the information gathered to improve teaching and the curriculum.

In addition, primary schools should:

- refocus attention on:

[1] Mathematics: made to measure 10 May 2012, No. 110159 Ofsted

- improving pupils' progress from the Early Years Foundation Stage through to Year 2 to increase the attainment of the most able
- acting early to secure the essential knowledge and skills of the least able.

Features of good and outstanding teaching were:

Prime practice: three examples of good use of ICT
At the start of the day at a primary school, pupils registered on arrival at their classes using the interactive whiteboards. Year 2 pupils, for instance, placed their name in the correct quarter of a Caroll diagram, indicating whether they were a girl or not, and were having school dinners or not.

In a Year 6 class, pairs of pupils used computers to draw acute and obtuse angles. The software allowed them to draw an estimate for a given angle, for example, 170°, after which it told them what angle they had created, and allowed further improved angles to be drawn. This aided pupils' conceptualisation of angles of different sizes.

Prime practice: a substantial problem that linked new and previous learning
The problem was on a new topic, to find an area enclosed by two curves expressed in polar coordinates (as illustrated). The problem had multiple steps but was not broken down for the pupils by the teacher. The pupils thought out and discussed their ideas, realising that to solve the problem they had to sketch the curves, find where they intersected, figure out how to find the area, and then calculate it.
At each stage of the problem the pupils' prior learning, though sometimes rusty, was brought into play, but for a purpose. Learning in this lesson made good links with new and earlier learning and the pupils had to think very hard for themselves.

Prime practice: effective teaching by a higher level teaching assistant
In a mixed-age Key Stage 1 class, a higher level teaching assistant was working with a lower-attaining group on a measuring task.
Pupils first matched each of the diverse group of party guests (baby mice through to a giant) to various balloons. Then they had to measure string of differing lengths (5cm to 2m) for tying onto the balloons for each guest. The higher level teaching assistant encouraged good debate between the pupils around whether the string should be measured and cut before tying, or tied first and then measured. She did not steer them towards the other approach when they decided to measure and tie the string first. The pupils wrestled with measuring the string after tying it to the balloons which enabled them to appreciate the difficulty of measuring accurately once the string was attached to the balloon. They also realised that some of the string was used up in tying it to the balloon. This led to good discussion around which approach should be taken. The pupils

revised their strategy for the task, which they went on to complete successfully.

Prime practice: good questioning skills

Year 4 pupils had previously been working on measures and collecting and interpreting data. In this lesson they would use Venn diagrams to classify mathematical objects. The teacher was skilled in asking questions, encouraging pupils to refine their answers. Pupils suggested sorting the geometric shapes displayed on the interactive whiteboard. His question 'What do you mean by shapes?' pushed the pupils into describing geometric properties for sorting. The teacher asked many incidental questions, such as 'What type of triangle is that?' Pupils realised that sorting by numbers of vertices gave the same groups as sorting by numbers of sides. The teaching assistant was working with low-attaining pupils using tiles that matched the shapes on the interactive whiteboard and which the pupils could physically sort into groups.

Having sorted the shapes in different ways, the teacher moved onto one and two-digit numbers. When one pupil chose to sort the numbers into the 'two- and three-times tables', the teacher asked, 'Does this leave any numbers over?' which it did. This generated considerable discussion around multiples. After the numbers had been sorted in different ways, the teacher set each group a different activity: all made good progress.

Prime practice: a mathematically rich Reception classroom

The teacher seized every opportunity for children to use mathematics in everyday activities. Working out daily attendance and absences of boys and girls became a shared activity, which significantly improved children's addition and subtraction skills. Similarly, every opportunity was taken to develop children's understanding and use of mathematical language. Mathematical games proved highly engaging as children cast dice, played matching card games, rolled marbles into numbered compartments and used the computer to investigate patterns and number sequences. The stimulating outdoor environment buzzed with activity as children organised races on foot and using wheeled vehicles, for which they receive rosettes to develop a clear understanding of ordinal numbers (1st, 2nd, 3rd…). Other children constructed stepped walls using building blocks, and learnt to count forward and back as they moved soft toys from one step to another. On special occasions, children are given £1 to spend at the local shop. With help from adults, they produce simple shopping lists to decide what they want to buy and what they can afford. This engagement in mathematics develops children's confidence, understanding and enjoyment of using mathematics in everyday life.

A good understanding of place value is considered to be of paramount importance by the school. This was supported by a wide range of practical equipment including base-10 apparatus, 100 squares, bead strings, place-value cards and number lines. Because pupils also required good instant recall of number facts, such as number bonds to 10, and, later, multiplication tables, every opportunity was taken to develop them.

Prime practice: good use of assessment in the infant years

Reception children were organised into ability groups, based on observational assessments of their attainment, and they engaged in short, focused, adult-led activities each day. They also had good opportunities to develop their reasoning and problem-solving skills through child-initiated activities, indoors and outside. As a result, less than 10% of children each year fail to reach at least six points in all areas of mathematics by the end of Reception (in comparison with 74% nationally in 2011). For those not reaching this standard on transfer into Year 1, individual plans ensured that Year 1 teachers focused on aspects of the EYFS curriculum required to bring their attainment up to the expected level.

Prime practice: a well-resourced intervention session with pupils who had special educational needs and/or disabilities

Three Year 1 pupils who had special educational needs worked with a teaching assistant on achieving their individual education plan target. The school has placed increased emphasis on the development of life skills for these pupils. In this session, they were engaged in buying items up to a value of 20p using the correct coins. The activity was well resourced. Pupils chose to buy from a colourful array of priced toys. With sensitive support from the teaching assistant, pupils were learning to use different coins to match the price correctly. They were encouraged to check each other's calculations, which ensured they were actively involved in the process all the time. One pupil was anticipating a cost before his turn. When the teaching assistant asked him to choose a priced item, he Mathematics: made to measure 86 May 2012, No. 110159 already had the correct coins set out on the table. The teaching assistant explained that this pupil had made remarkable progress and would not require prolonged intervention of this nature.

Part F: Mathematics: Quality of Education – Good (in old money[2])

Ofsted produced this guidance to support their subject specific reviews (Di above)

This outlines, albeit from 8 years ago (2013), the last time that Ofsted wrote a set of subject specific criteria to complement the 'generic' whole school criteria in the then Inspection Framework. Whilst there is now a new Inspection Framework (May 2019) what was 'good' learning & teaching in Mathematics in 2013 is clearly still 'good' Mathematical learning & teaching today.

I have taken the criteria for 'good' as a starting point, not as a deficit model, i.e. not using 'outstanding' but, because I make the assumption that all teachers and pupils want to have a good days learning & teaching. If both a subject and senior leaders' evaluation is that provision meets the criteria for 'good' then there is every good reason to refer to the criteria for 'outstanding'. The subject specific criteria for Outstanding (from 2013) are in Annex 1.

Achievement (which is now (2021) termed as Impact)

- Pupils understand some important concepts and make some connections within mathematics.
- Pupils develop a range of skills in using and applying mathematics. They are able to work independently, and sometimes take the initiative in solving problems in various contexts.
- Many pupils show a developing ability to think for themselves, and are willing to try when faced with challenges.
- Pupils are willing to learn from mistakes and false starts.
- When investigating mathematically, most pupils are able to reason, generalise, and make sense of solutions.
- Pupils are generally fluent in performing written and mental calculations and mathematical techniques.
- The use of mathematical language and symbols is mostly accurate in the presentation of pupils' work and in discussions.
- Pupils enjoy the subject and can explain its value.

[2] Taken from the Subject Specific Guidance (Ofsted 2013)

Teaching (which is now (2021) termed Implementation)

- Teaching develops pupils' understanding of important concepts as well as their proficiency in techniques and recall of knowledge, equipping pupils to work independently.
- Teaching helps pupils to see that topics are connected and form a 'big picture'.
- Many opportunities are provided for problem solving in various contexts, discussion and investigation, although these are not always integral to learning.
- Teachers focus on pupils' understanding when questioning, listening and observing.
- Barriers to learning and misconceptions are tackled well.
- Teachers have a good level of specialist expertise which they use well in planning and teaching mathematics.
- They use an appropriate range of resources and teaching strategies, including practical activities and, where appropriate, the outdoor environment.
- Teachers have a clear understanding of the value of their subject which they communicate effectively to pupils, often with enthusiasm.
- Some links are made between mathematics and other subjects and with mathematics beyond the classroom.
- Marking identifies errors and misunderstanding and helps pupils to overcome difficulties.

Curriculum (which is now (2021) termed Implementation)

- The curriculum is broad, balanced and well informed by current initiatives in the subject. It is designed to match to a range of pupils' needs and interests, and ensure effective continuity and progression in their learning in the subject and in the qualification pathways they follow, including into further study.
- All pupils have opportunities to solve problems and investigate although the extent to which these are integral to their learning may vary.
- Guidance for teachers on activities and approaches that promote conceptual understanding, including the use of ICT, supports pupils' experiences across the breadth and depth of the mathematics curriculum.
- Intervention and support are focused on pupils' individual needs so that they make good progress.
- Good links are forged with other agencies and the wider community to provide a range of enhancement and enrichment activities to promote pupils' learning and their engagement with the subject.
- Links with other subjects in the school strengthen pupils' learning in mathematics.
- Opportunities to promote pupils' spiritual, moral, social and cultural development are planned and delivered systematically.

Leadership (which is now *(2021): both a separate criteria of L&M as well as within Intent & Implementation)*

- Leaders demonstrate good subject expertise and are well informed by current developments in mathematics education.
- Subject reviews, self-evaluation and improvement planning are clearly focused on raising attainment and improving provision in mathematics.
- A sense of common purpose is shared among those involved in teaching mathematics. Opportunities to share practice and access subject training are good.
- Appropriate support and guidance on teaching and the curriculum is provided for the teachers.
- The subject engages with wider whole-school priorities effectively including literacy and numeracy policies.

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Part G: Mathematics: Quality of Education (Good)

This template includes the current criteria for 'Good' from the Quality of Education judgement along with columns for the SL / SLT to insert where they perceive is a best-fit with the 'old' subject specific criteria along with their own internal evidence.
As such it serves two purposes, one as a CPD activity to consider the match between the 'old' subject specific criteria and then 'new' criteria and secondly to benchmark / evaluate the school's provision against this.

INTENT		
NEW HANDBOOK	**EVIDENCE**	**OLD SUBJECT CRITERIA**
Leaders adopt or construct a curriculum that is ambitious and designed to give all pupils, particularly disadvantaged pupils and including pupils with SEND, the knowledge and cultural capital they need to succeed in life. This is either the national curriculum or a curriculum of comparable breadth and ambition. [*If this is not yet fully the case, it is clear from leaders' actions that they are in the process of bringing this about.*]		
The school's curriculum is coherently planned and sequenced towards cumulatively sufficient knowledge and skills for future learning and employment. [*If this is not yet fully the case, it is clear from leaders' actions that they are in the process of bringing this about.*]		
The curriculum is successfully adapted, designed or		

developed to be ambitious and meet the needs of pupils with SEND, developing their knowledge, skills and abilities to apply what they know and can do with increasing fluency and independence. [*If this is not yet fully the case, it is clear from leaders' actions that they are in the process of bringing this about.*]		

IMPLEMENTATION		
NEW HANDBOOK	**EVIDENCE**	**OLD SUBJECT CRITERIA**
Teachers have good knowledge of the subject(s) and courses they teach. Leaders provide effective support for those teaching outside their main areas of expertise.		
Teachers present subject matter clearly, promoting appropriate discussion about the subject matter being taught. They check pupils' understanding systematically, identify misconceptions accurately and provide clear, direct feedback. In so doing, they respond and adapt their teaching as necessary without unnecessarily elaborate or individualised approaches.		
Over the course of study, teaching is designed to help pupils to remember long term the content they have been taught and to integrate new knowledge into larger ideas.		
Teachers and leaders use assessment well, for example to help pupils embed and use knowledge fluently, or to check understanding and inform teaching. Leaders understand the limitations of assessment and do not use it		

in a way that creates unnecessary burdens on staff or pupils.		
Teachers create an environment that focuses on pupils. The textbooks and other teaching materials that teachers select – in a way that does not create unnecessary workload for staff – reflect the school's ambitious intentions for the course of study. These materials clearly support the intent of a coherently planned curriculum, sequenced towards cumulatively sufficient knowledge and skills for future learning and employment.		
The work given to pupils is demanding and matches the aims of the curriculum in being coherently planned and sequenced towards cumulatively sufficient knowledge.		
Reading is prioritised to allow pupils to access the full curriculum offer.		
A rigorous and sequential approach to the reading curriculum develops pupils' fluency, confidence and enjoyment in reading. At all stages, reading attainment is assessed and gaps are addressed quickly and effectively for all pupils. Reading books connect closely to the phonics knowledge pupils are taught when they are learning to read.		
The sharp focus on ensuring that younger children gain phonics knowledge and language comprehension necessary to read, and the		

skills to communicate, gives them the foundations for future learning.		
Teachers ensure that their own speaking, listening, writing and reading of English support pupils in developing their language and vocabulary well.		

IMPACT		
NEW HANDBOOK	**EVIDENCE**	**OLD SUBJECT CRITERIA**
Pupils develop detailed knowledge and skills across the curriculum and, as a result, achieve well. This is reflected in results from national tests and examinations that meet government expectations, or in the qualifications obtained.		
Pupils are ready for the next stage of education, employment or training. They have the knowledge and skills they need and, where relevant, they gain qualifications that allow them to go on to destinations that meet their interests and aspirations and the intention of their course of study. Pupils with SEND achieve the best possible outcomes.		
Pupils' work across the curriculum is of good quality.		
Pupils read widely and often, with fluency and comprehension appropriate to their age. They are able to apply mathematical knowledge, concepts and procedures appropriately for their age.		

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Part H: Mathematics: Quality of Education (Good)– exemplar

*This is my initial interpretation of a best-fit between the previous **(Part E)** subject criteria and the current (2021) QoE (2021) criteria **(Part F).***

INTENT		
NEW HANDBOOK	**EVIDENCE**	**OLD SUBJECT CRITERIA**
Leaders adopt or construct a curriculum that is ambitious and designed to give all pupils, particularly disadvantaged pupils and including pupils with SEND, the knowledge and cultural capital they need to succeed in life. This is either the national curriculum or a curriculum of comparable breadth and ambition. [*If this is not yet fully the case, it is clear from leaders' actions that they are in the process of bringing this about.*]		The curriculum is broad, balanced and well informed by current initiatives in the subject. It is designed to match to a range of pupils' needs and interests, and ensure effective continuity and progression in their learning in the subject and in the qualification pathways they follow, including into further study. Leaders demonstrate good subject expertise and are well informed by current developments in mathematics education.
The school's curriculum is coherently planned and sequenced towards cumulatively sufficient knowledge and skills for future learning and employment. [*If this is not yet fully the case, it is clear from leaders' actions that they are in the process of bringing this about.*]		All pupils have opportunities to solve problems and investigate although the extent to which these are integral to their learning may vary. Links with other subjects in the school strengthen pupils' learning in mathematics.
The curriculum is successfully adapted, designed or developed to be ambitious and meet the needs of pupils with		Intervention and support are focused on pupils' individual needs so that they make good progress.

SEND, developing their knowledge, skills and abilities to apply what they know and can do with increasing fluency and independence. [*If this is not yet fully the case, it is clear from leaders' actions that they are in the process of bringing this about.*]		

IMPLEMENTATION		
NEW HANDBOOK	**EVIDENCE**	**OLD SUBJECT CRITERIA**
Teachers have good knowledge of the subject(s) and courses they teach. Leaders provide effective support for those teaching outside their main areas of expertise.		Leaders demonstrate good subject expertise and are well informed by current developments in mathematics education.
Teachers present subject matter clearly, promoting appropriate discussion about the subject matter being taught. They check pupils' understanding systematically, identify misconceptions accurately and provide clear, direct feedback. In so doing, they respond and adapt their teaching as necessary without unnecessarily elaborate or individualised approaches.		Intervention and support are focused on pupils' individual needs so that they make good progress. A sense of common purpose is shared among those involved in teaching mathematics. Opportunities to share practice and access subject training are good. Appropriate support and guidance on teaching and the curriculum is provided for the teachers.
Over the course of study, teaching is designed to help pupils to remember long term the content they have been taught and to integrate new knowledge into larger ideas.		Teaching helps pupils to see that topics are connected and form a 'big picture'.
Teachers and leaders use assessment well, for example to help pupils embed and use knowledge fluently, or to check understanding and inform teaching. Leaders understand the limitations of assessment and do not use it in a way that		Barriers to learning and misconceptions are tackled well. Teachers have a good level of specialist expertise which they use well in planning and teaching mathematics.

creates unnecessary burdens on staff or pupils.		Marking identifies errors and misunderstanding and helps pupils to overcome difficulties
Teachers create an environment that focuses on pupils. The textbooks and other teaching materials that teachers select – in a way that does not create unnecessary workload for staff – reflect the school's ambitious intentions for the course of study. These materials clearly support the intent of a coherently planned curriculum, sequenced towards cumulatively sufficient knowledge and skills for future learning and employment.		They use an appropriate range of resources and teaching strategies, including practical activities and, where appropriate, the outdoor environment.
The work given to pupils is demanding and matches the aims of the curriculum in being coherently planned and sequenced towards cumulatively sufficient knowledge.		Teaching develops pupils' understanding of important concepts as well as their proficiency in techniques and recall of knowledge, equipping pupils to work independently. They use an appropriate range of resources and teaching strategies, including practical activities and, where appropriate, the outdoor environment.
Reading is prioritised to allow pupils to access the full curriculum offer.		
A rigorous and sequential approach to the reading curriculum develops pupils' fluency, confidence and enjoyment in reading. At all stages, reading attainment is assessed and gaps are addressed quickly and effectively for all pupils. Reading books connect closely to the phonics knowledge pupils are taught when they are learning to read.		

The sharp focus on ensuring that younger children gain phonics knowledge and language comprehension necessary to read, and the skills to communicate, gives them the foundations for future learning.		
Teachers ensure that their own speaking, listening, writing and reading of English support pupils in developing their language and vocabulary well.		

IMPACT		
NEW HANDBOOK	**EVIDENCE**	**OLD SUBJECT CRITERIA**
Pupils develop detailed knowledge and skills across the curriculum and, as a result, achieve well. This is reflected in results from national tests and examinations that meet government expectations, or in the qualifications obtained.		Pupils understand some important concepts and make some connections within mathematics. When investigating mathematically, most pupils are able to reason, generalise, and make sense of solutions.
Pupils are ready for the next stage of education, employment or training. They have the knowledge and skills they need and, where relevant, they gain qualifications that allow them to go on to destinations that meet their interests and aspirations and the intention of their course of study. Pupils with SEND achieve the best possible outcomes.		Pupils develop a range of skills in using and applying mathematics. They are able to work independently, and sometimes take the initiative in solving problems in various contexts. Pupils are generally fluent in performing written and mental calculations and mathematical techniques. The use of mathematical language and symbols is mostly accurate in the presentation of pupils' work and in discussions.
Pupils' work across the curriculum is of good quality.		Many pupils show a developing ability to think for themselves, and are willing to try when faced with challenges. Pupils are willing to learn from mistakes and false starts.

Pupils read widely and often, with fluency and comprehension appropriate to their age. They are able to apply mathematical knowledge, concepts and procedures appropriately for their age.		Pupils enjoy the subject and can explain its value.

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Part I: Preparing for a subject specific deep-dive: Mathematics

Resources (to have at hand)

- Maths self-evaluation report
- Maths development (action) plan
- Long / medium term planning, including your progression map (skills; knowledge)
- Examples of pupil's work across year groups (at least from say EY / KS1 / KS2), including sequential learning

Suggested questions

(When responding to any questions, try not to focus solely on 'describing' what you / colleagues have been engaged in, BUT: what has been the impact / outcome of any actions.)

- Are you covering all the statutory content of the national curriculum for Mathematics in each year group? What about 'problem-solving' skills? Are cross-curricular links highlighted?
- How do the concepts you teach progress up through the years and during the course of a unit of lessons? Is there a logical sequence to the lessons?
- What strategies do you use to assess learning? Do your teachers know where the children are in terms of Mathematics knowledge and 'problem-solving' skills?
- Are pupils encouraged to develop a wide mathematical vocabulary? Do you provide opportunities for them to talk like mathematicians and discuss mathematical ideas with each other?
- Do you have an up-to-date action plan which identifies weaknesses and outlines steps to address them?
- How is your curriculum coverage planned to ensure progression throughout the school? (e.g. is it already on the school's website?)
- How do you ensure coverage of the Mathematics curriculum across all year groups?
- What published schemes, if any, do you follow? Or, if not – how have you planned your own SoW?

- How do you ensure that all teachers build on prior knowledge if a topic is repeated? (e.g. Light in Mathematics)
- Explain the rationale behind your yearly overview – why certain topics are taught in a particular order (e.g. why you teach Fractions in the Spring term)?
- How do you plan for the progression of knowledge and mathematical skills – what was the prior knowledge from the year before (if topic also appeared in that year group) and what were the prior mathematical skills? Is the current class teacher aware of this?
- What CPD have Staff had on the Mathematics curriculum, why (e.g. how did you identify the need) and what has / is the impact of this?
- How confident are teachers, including TA's in teaching the whole of the Mathematics curriculum?
- What do children think of your subject?
- What links are there between Mathematics and the rest of the curriculum? (e.g. can you give me some examples?)
- How do you know if pupils 'learn and remember the curriculum'?
- How do you monitor your subject? And what does this tell you about the quality of Teaching & learning?
- How do you use the wider community, e.g. trips, visitors in your subject?
- What's on your action plan this year? And why?
- What are the strengths/ areas for development in your subject?
- How do teachers differentiate in Mathematics lessons?

Lesson Observations

- How does the lesson fit in with the overview for your subject?
- Is the correct vocabulary being used?
- How are misconceptions addressed? Are teachers thinking of them prior to teaching in order to prevent/tackle them?
- How do teachers use questioning to target specific pupils and in a sequential/chronological order? Do they routinely 'dig deeper' to try to find out a pupils reasoning (e.g. awareness of disciplinary knowledge)?
- Are the children learning new knowledge and skills?
- Does the teacher's questioning encourage learning and enquiry?
- Is the teacher's subject knowledge good?
- What would you expect to see in 'good' Mathematics lessons?

Book Scrutiny

An example:

Prior to lesson visits Lead Inspector took 6 children from each of the 2 lessons observed and asked them to talk through individual pieces of work in their books. Pupils also had to explain what they had learnt in that lesson.

- *Learning Objectives have to be tight and refer to the learning in the lesson.*
- *Explain how the tasks taught link to your subject overview and what would come next.*

- *Where is there evidence of what you have put in place and the impact it has had? Link to action plan. Where have you identified weaknesses and what have you done about it?*
- *How do you ensure that there is consistency across the year groups?*
- *How do you ensure that children remember what they have learnt?*
- *When the inspection team were looking at books with the small steps for the year group:*
- *Can you show me where this individual lesson fits in the sequence of lessons?*
- *What objective is this?*
- *Can you talk me through the book? What are you seeing?*
- *Where will they go from here?*

Annex 1: Mathematics – Outstanding (2013 Criteria [3])

Outcomes (now (2021) termed Impact)

- Pupils understand important concepts and make connections within mathematics.
- Pupils develop a broad range of skills in using and applying mathematics. They show exceptional independence and take the initiative in solving problems in a wide range of contexts, including the new or unusual.
- Pupils think for themselves and are prepared to persevere when faced with challenges, showing a confidence that they will succeed.
- Pupils embrace the value of learning from mistakes and false starts.
- When investigating mathematically, pupils reason, generalise and make sense of solutions.
- Pupils show high levels of fluency in performing written and mental calculations and mathematical techniques.
- Mathematical language and symbols are used accurately in pupils' work and in discussions.
- Pupils develop a sense of passion and commitment to the subject.

Teaching (now (2021) termed Implementation

- Teaching is rooted in the development of all pupils' conceptual understanding of important concepts and progression within the lesson and over time. Teaching enables pupils to make connections between topics and see the 'big picture'.
- Teachers nurture mathematical independence, allowing time for thinking and encouraging discussion. Problem solving, discussion and investigation are integral to pupils' learning of mathematics.
- Constant assessment of each pupil's understanding through questioning, listening and observing enables fine tuning of teaching.
- Barriers to learning and potential misconceptions are anticipated and overcome, with errors providing fruitful points for discussion.
- Teachers communicate high expectations, enthusiasm and passion about the subject to pupils.
- Teachers have a high level of confidence and expertise both in terms of their specialist knowledge and their understanding of effective learning in mathematics. They use a very wide range of teaching strategies to stimulate all pupils' active participation in their learning

[3] Taken from the Subject Specific Guidance (Ofsted 2013)

drawing on innovative and imaginative resources that include practical activities and, where appropriate, the outdoor environment.
- Teachers exploit links between mathematics and other subjects and with mathematics beyond the classroom.
- Marking distinguishes well between simple errors and misunderstanding and tailors insightful feedback accordingly.

Curriculum (now (2021) termed Intent)

- The imaginative, stimulating mathematics curriculum is skilfully designed to match to the full range of pupils' needs and interests and to ensure highly effective continuity and progression in their learning and in the qualification pathways they follow, including into further study.
- Problem solving and investigative approaches are central to learning for all pupils.
- Clear guidance for teachers on activities and approaches that promote conceptual understanding, including the use of ICT, ensures all pupils benefit and experience breadth and depth in learning across the mathematics curriculum.
- Intervention and support are focused and finely tuned to pupils' individual needs so that they make rapid progress.
- Excellent links are forged with other agencies and the wider community to provide a wide range of enhancement and enrichment activities to promote pupils' learning and engagement with the subject.
- Links with other subjects in the school are highly productive in strengthening pupils' learning in mathematics.
- Rigorous curriculum planning ensures that mathematics makes an outstanding contribution to pupils' spiritual, moral, social and cultural development.

Leadership (*Now (2021): both a separate criteria L&M as well as within Intent & Implementation)*

- Leadership is informed by a high level of subject knowledge, subject-specific pedagogy and vision for mathematics in the school. The track record of innovation is strong, insightful and carefully evaluated.
- Subject reviews, self-evaluation and improvement planning are well informed by current good practice in mathematics education.
- Subject leaders inspire confidence and wholehearted commitment from pupils and colleagues. Strategies to share good practice and secure high-quality professional development in the subject are very effective.
- Outstanding support and guidance on teaching and the curriculum is provided for the teachers, including any non-specialists and the less experienced.
- The subject is at the cutting edge of initiatives within the school and makes an excellent contribution to whole-school priorities, including consistent application of literacy and numeracy policies.

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educational consultants

Annex 2: Meeting the needs of pupils with SEND

Notes taken from
Teacher Handbook SEND – Embedding inclusive practice (January 2024)
(https://nasen.org.uk/resources/teacher-handbook-send)

Planning inclusive lessons

- In the first instance the purpose, process and products of the lesson (the learning journey/intent) need to be clearly articulated to learners and time taken to ensure all learners understand the journey ahead.
- Connection making can reduce a learner's fear of the unknown and can make them more ready to engage in the learning.
- Always present connections in a clear manner, verbally and visually; some learners will likely require a scaffold, for example a visual representation or key vocabulary, in their books that they can refer to at the start of each lesson.
- As all foundation subjects are often only an hour or so a week (out of 25 hours of lessons), some learners are likely to need a reminder of what they are learning about at the start of a lesson, and where it sits within the learning sequence as well as where it sits in relation to other relevant subject specific contexts and knowledge that it is building upon, prior to a whole-class retrieval starter activity.

When planning inclusive lessons, teachers need to consider how they can enable pupils to engage with the new learning:

- Are you connecting previous learning - are there prior skills or knowledge that learners can build on in this unit of study?
- Are there key words whose meanings they need to be able to understand in order to be able to engage with the core concepts being taught?
- Are there pre-requisite skills or knowledge that are required to be successful, e.g. in **History:** do pupils need a clear understanding of the difference between primary & secondary sources?

Task:

- *Have you identified the key subject specific words for each of the topics that pupils will learn during each year and how/when are these made available to pupils?*
- *What subject specific skills will pupils need to know and understand prior to the start of each new topic? And how will you ensure that pupils will be able to practice these?*

- Explicit instruction needs to be carefully planned for learners with SEND.
- New material needs to be delivered in small steps, with teachers considering how much information is presented at any one time.

- All new material should be presented both verbally and visually (dual-coded) wherever possible.
- High-interest, engaging materials such as images or short documentary clips can provide a strong start to a lesson, e.g. in **Geography** a short clip of an erupting volcano can help learners begin to understand the impact of an eruption the surrounding area.

Task:

- *Have you identified for each topic 'high-interest, engaging materials' that will be accessible to all pupils?*

- Less confident learners will benefit from having access to content of a time period prior to reading as this can motivate and support them when working through what may for them be challenging texts.

Task:

- *How do you make available to all pupils resources to support them prior to the introduction of each new topic?*

Modelling and scaffolding are key components of an inclusive lesson.

- Learners benefit from seeing the teacher model the application of for e.g. in **Art & Design** of skills in connection with subject content and watching a teacher perform 'live' research and live writing.
- A teacher / assistant 'thinking aloud' whilst modelling writing tasks can support learners when they progress to independent practice.
- Modelling should be a planned part of every lesson, with further modelling and/or scaffolding as needed when identified through formative assessment in a lesson.
- Given that for almost all foundation subjects, lessons are usually spread apart over a week/fortnight, it is crucial that new learning is recapped at the start of the following lesson. Teachers should also ensure, wherever possible, to address any misconceptions within that lesson. Misconceptions that are observed through marking between lessons can be addressed through short videos uploaded on a virtual classroom between lessons and/or at the start of the next lesson.
- For some learners with additional learning needs, misconceptions can become embedded in their understanding, impacting further progression. It is therefore vital that misconceptions are addressed directly at the earliest possible stage. It will often be beneficial to address these misconceptions in small groups or with individuals to check understanding.

Task:

- *Have you identified what 'may be' the common misconceptions that teachers and assistants need to be aware of prior to the start of each new topic? (e.g. in **Geography** it's not uncommon for pupils to be clear about the differences between: ocean; sea & channel. In **Science**, it is frequently: permeable; porous; pervious & absorbant.)*

Teaching strategies that can support learners in answering whole-class questions in lessons are:

- Additional processing time, e.g. provide questions to learners in advance of the discussion • Visual prompts

- Co-constructing answers with peers, e.g. Think - Pair - Share
- Pre-teaching content ahead of the lesson
- Mixed-ability groupings
- Communication aids
- Sentence frames and/or sentence starters with explicit reference to language function (specific to **Scientific** skills, e.g. hypothesising, summarising, evidencing).

Strategies to Scaffold Learning

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

- Encourage oracy; talking about writing first and unpicking tricky words results in better understanding and written fluency. Think, Pair, Share tasks are essential, and enabling learners with SEND to succeed here by seating them near a student who is more confident with speaking would be an asset.
- Provide sentence starters and key word banks, ideally as a generic 'literacy mat' which can be used alongside knowledge organisers to embed common styles of geographical writing.
- As evaluation is a key skill it should be built into all topics. This is often challenging for pupils, especially those with SEND. Showing learners how to evaluate using models, guided examples on a visualiser, and guided reading are very helpful. Using an evaluation prompt, such as the one below, can be very useful to enable the students to apply their own ideas to the evaluation.
- Remember that **Historical; Geographical & Scientific** literacy is often high level. Consider your own use of tier 2 and 3 language in explanations; make links to everyday language and ensure your use of tier 2 and 3 language is accessible. Regularly check understanding of learners with SEND through questioning.
- Provide visual aids to enable learners to identify, for e.g. in **Art & Design:** artists and their work, as well as to identify equipment and media**; Design & Technology –** the tools and techniques they will be expected to use / perform**; Geography –** rivers around the world; different building styles and materials / rural and urban environments; **History –** images of where in the world specific events took place and of the people involved**.**
- Use frequent modelling to show learners how to structure sentences but keep it achievable; it is better to model an imperfect answer and ask the learner to suggest improvements than to model an unachievably high-quality response. This is especially important when preparing for assessments and giving feedback, so learners clearly understand how they can achieve an excellent answer and improve their own.
- Using extended guided reading in lessons is an essential way of enabling all learners, and especially those with SEND, to access the content effectively. Articles should be adapted where necessary, and often it is more effective to write pieces bespoke for the topic you are doing. The process of delivering these in class is also important to get right, and there is an example of a Highly Intentional Process below, Figure 1, page 4. (Figure 2 on page 5 is a task for the subject leader to complete)

Figure 1: Highly Intentional Process - Guided reading in Geography Lessons

HIP stage	Activity	Rationale/ notes	Sample Language
0: Homework to learn vocabulary (1 week before the reading)	In the week before the reading is used, set a homework assignment where the vulnerable students (or all of the students) are given a copy of the key vocabulary to learn. This should also be shared with the EAL/SEN/Literacy coordinators and TAs where relevant	This reduces the cognitive load for the students when the reading happens in class, and enables them to have a deeper understanding of the text as it is read	This homework is important so that we can make the most of the reading time next week. It will also enable you to tackle the task we do following the reading and succeed with this.
1: Pre-teach vocabulary (1-3 mins max - be careful not to spend too long)	Using the glossary, which is found at the start of the article, Select up to 5 pieces of tier 2 or 3 vocabulary from the article. Teach it directly, giving a simple definition and one or two sentences using the word. Ensure that you make the pronunciation of the word clear. Some teachers may want the class to repeat the words back to them - this will depend on your class dynamic.	Teach briskly - limit the number of questions. Word choice and definitions must be preprepared - it is very difficult to make up on the spot and retain clarity.	This word is …. Say it back to me (my turn your turn) It means …… It might be used like this (example 1) Or like this (example 2)
2: Preview the article (1-3 mins max - be careful not to spend too long)	Explain to the students what the article will be about, and what content it will cover. Teachers should also explain WHY the article is being read - this is important metacognitively - and could be related to why the knowledge is important, but also what they will be using the knowledge for afterwards (eg extended writing/ comprehension questions)	Helps students feel secure before reading, and be more likely to understand Head off any likely misconceptions re particularly difficult words, ideas or concepts	We are going to learn from an article about…. Some of the things it will help us to understand are… Look out for the section about…. Basically, this means that …..
3: Teacher reads (approx 15 mins but will vary)	Teacher reads from the article with enthusiasm and clarity. Teacher uses this stage to inspire the class: invite questions, explain things, check understanding. As you read each paragraph, scroll through the visual prompts on the board. Do explain these but not for more than 15 seconds to try not to break the flow of the reading too much. Depending on the class, their confidence and your feeling, you may also want to try 'jump in' reading. This is when the teacher pauses on a word of note (often those in the glossary) and the whole class repeats it out loud. If going on to do extended writing, the students should highlight sections which are relevant to the question they will be answering. If doing comprehension questions, this is not needed as	Allows teachers to teach and inspire Provides another opportunity to check and address misconceptions The jump in reading can aid in concentration and tracking, and also enhance the ability of students in their pronunciation of the more challenging and relevant key terms	Now's your chance to check that you understand, and ask any questions you may have.

	questions will be numbered to match paragraphs and students should have to look and re-read sections to find answer.		

Figure 2: Highly Intentional Process - Guided reading in xxxxxx Lessons
(This is a task for you to complete)

HIP stage	Activity	Rationale/ notes	Sample Language
0: Homework to learn vocabulary (1 week before the reading)	In the week before the reading is used, set a homework assignment where the vulnerable students (or all of the students) are given a copy of the key vocabulary to learn. This should also be shared with the EAL/SEN/Literacy coordinators and TAs where relevant	This reduces the cognitive load for the students when the reading happens in class, and enables them to have a deeper understanding of the text as it is read	This homework is important so that we can make the most of the reading time next week. It will also enable you to tackle the task we do following the reading and succeed with this.
1: Pre-teach vocabulary (1-3 mins max - be careful not to spend too long)			
2: Preview the article (1-3 mins max - be careful not to spend too long)			
3: Teacher reads (approx 15 mins but will vary)			

How can I support learners who struggle to retain vocabulary?

- Print knowledge organisers including word banks and visual supports for learners with SEND who need them as a reference in every lesson.
- Use retrieval practice at the start of lessons to revisit key words, identify and repeatedly focus on the most important tier 3 vocabulary. Use oracy strategies; learners are more likely to retain words between lessons if they are able use them verbally in sentences. This will include questioning to probe learners to retrieve the correct word.
- Ask learners to highlight where they have used key vocabulary in their sentences in order to recognise and reinforce this skill.

Task:

- Have you identified key vocabulary / terms for each topic and do all pupils have access to these before and during lessons?

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

- Work with colleagues to embed geographical numeracy in the curriculum, so that learners come to expect it as part of geography lessons, e.g. mean, median, mode, range and interquartile range
- Work with colleagues in the maths department to ascertain how and when mathematical skills and concepts are taught. If there are resources learners use to scaffold their learning in maths, ensure they have access to them in geography as well.
- Allow the use of calculators. As they are always permitted in geography exams, they should also be available in lessons.

Task:

- Have you worked alongside the subject leader for Mathematics to identify where learning in the subject you lead can support pupils numeracy?

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

- What will hold learners back if they don't understand it? Identify what the 'threshold concepts' in each topic are, e.g. democracy; evaluation; analysis & composition and refer to these concepts in some way during every lesson.
- Give examples of the same concept in different contexts. Try to personalise this or use examples from the news/ media/local area, at least something that is 'relevant' to the pupils. This is a vital part of effective teaching, with teachers regularly referring to recent events to engage the learners, and encourage them to go and seek out information themselves independently.
- Plan specific hinge questions you will ask learners, to ensure you can evaluate the extent to which each learner is understanding. Probe learners to go beyond three-word responses to questions.
- Anticipate misconceptions and when they arise in lessons, challenge them quickly; include them in your explanations.

- Ensure that all resources are uploaded for all lessons and homework and revision onto a suitable electronic platform, e.g. Google Classroom, and clearly labelled so that learners, support staff and families can access these remotely and at any time. This will enable learners to recap work and concepts where they need to and want to.

Task:

- Have you identified in advance of a topic the key questions which you will want to ask of pupils – questions that address not only: who; what; where; when; why and how as well as: similarities / differences; cause & effect; rank in order of importance; synthesise your responses, etc

How can I support learners who struggle with attention?

- Plan seating arrangements carefully. Consider the use of proximity for learners who need prompting. Also, ensure learners are sat away from distractions - these could be environmental, e.g. windows next to a playground, or relational, e.g. peers.
- Share the big picture of the lesson but also show examples of the outcome so that learners can visualise what the overall aim is.
- Chunk lessons into distinct episodes of explanation, modelling, practice, feedback, etc. so that learners have a structure to expect. Represent these parts of the lesson on a visual timetable, which you refer to throughout the lesson.
- Plan in active breaks and opportunities for learners to move during lessons.
- Use behaviour-specific praise to reinforce effort and focus.

Task:

- Re: a visual of the outcome expected of pupils – do you have / are you starting to build up examples from 'past' pupils as to what a 'good' example would be to share with pupils?

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

- Predictable classroom routines are vital, with well-planned and structured lessons with clear expectations.
- Build trust through positive interactions and praise.

How can I support learners who struggle with fine motor skills?

- Consider using frames or adhesives (**e.g. in Art & Design and Design & Technology),** masking tape) that hold down learners' work to surfaces in cases where learners may struggle to hold a resource in place. Provide learners with larger scale materials to work on and gradually decrease the scale as they acquire greater control.
- Encourage learners to experiment with different media, for e.g. in **Art & Design** - when drawing offer chunkier graphite sticks as well as soft 'B' range pencils. Similarly, offer a range of painting application media – some learners may prefer a sponge to a brush or may even use their fingers at times.
- Plan each lesson well in advance, to consider points where learners may struggle and allow for adult guidance accordingly. Use of scissors can be a source of frustration for some learners and wider-handled or easy grip scissors can be a useful aid.

- Engaging in art and design activity is great for helping build fine motor skills for all children. Learners will enjoy and benefit from using malleable media such as clay or air dough.

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

- Provide opportunities for small group learning either before (pre-teach) or during the lesson. This will support learners and allow time to ask questions or explore resources alongside adult intervention. These opportunities are part of the repetition process needed to maximise capacity to build up conceptual understanding.
- Take time to model and demonstrate each element of a process, allowing learners to develop their understanding through a step by-step approach. This will benefit all learners as it allows for an active participatory approach.
- Showing outcomes from the previous lesson's work can be a useful memory aid.
- Have visual aids in the form of worked examples that the learners can have to hand when completing independent tasks.

Task:

- Do you have / are you building up a bank of examples of 'finished' work to share with pupils, so that they can visualise the learning process / journey?

How can I support learners who struggle with attention?

- Starting off each lesson with a 'hook' - a question or image which inspires curiosity - can help engage learners. This is most effective when two to three questions are displayed, at varying levels of complexity, with learners invited to choose and engage with one of the questions. It could be helpful if the hook has a link to their own context so that learners have a concrete reference point.
- A 'chunked' approach alongside cognitive shifts can aid attention and focus. For example, after having read independently for a set amount of time, learners can then discuss in small groups before writing an answer to a set question in their books. Having a dual-coded lesson plan with known images for the different parts of the lesson and time allocated can support learners in engaging in each component of the lesson.
- Develop tasks that keep pupils engaged in their learning, e.g. if showing a video clip, provide learners with phrases to listen for or key questions to answer.

Task:

Do pupils have access to a resource (e.g. pen / pencil / paper) when observing a video / images which has key words / questions (e.g. who: what; where; when; why and how) to focus their notes?