



Subject Policy

Mathematics

Reviewed by: Kimberley McPherson

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INTENT

Aims

At Debden Church of England Primary Academy, all of our curriculum disciplines are used to underpin our school vision, which is to be a highly-purposeful, caring Christian community, in which our children:

- Progress exceptionally well academically, across a broad and knowledge-rich curriculum;
- Develop into confident, compassionate, well-rounded individuals;
- Become equipped with the learning skills needed to deal with future challenges;
- Create happy, positive memories of their childhood.

Our maths curriculum has been carefully constructed through close consideration of both the expectations of the National Curriculum and the vision and contextual requirements of our school and its children. Through our maths curriculum, we aim for children to:

- 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
- 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.

At Debden Primary Academy, we view mathematics as essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

Our intent is to provide children with a mathematics curriculum that will allow them to become confident individuals through developing their mathematical skills to their full potential. We also aim to present maths as a challenging, exciting, creative and relevant subject in order to promote a positive and confident attitude.

Planning and Sequencing

Our maths planning is largely based on Schemes of Learning from White Rose Maths and enhanced by a number of other resources (see the 'Resources' section below). We have chosen these resources for a number of reasons,

including:

- They are well-renowned for having been written by subject experts in the teaching of mathematics;
- They place a heavy emphasis on number and place value (which is known to underpin all other areas of mathematics);
- They are the most commonly utilised schemes across UK curriculum schools, meaning that the high number of children transferring to us from other schools (due to our school's context with a high proportion of service families) encounter a smoother transition – there are not the sequencing/ coverage issues that there may otherwise be;
- The schemes are planned precisely into small-steps, allowing for logical, developmental progress, that gives children a strong foundation understanding before expanding into higher order thinking.

This ensures a progressive and thorough curriculum in every year group. Teachers know which objectives must be taught and assessed in each year group and can follow progressive small steps to ensure pupils have a comprehensive understanding of maths.

Calculation Policy: Our maths calculation policy provides the guidance and expectations for the teaching of addition, subtraction, multiplication and division for each year group, including which methods should be used at certain points in a child's development.

Maths Progression of Skills: The skills that we aim to equip all children with throughout each stage of their development are detailed within our progression of skills map.

Maths Knowledge: We have created knowledge organisers for each of our units of learning. These organisers map out the information that children should know and understand by the end of each teaching unit. They contain key details about the specific area of learning and specific information being studied. They are sent home to parents at the start of each unit, and are used by teachers throughout the planning, teaching and assessment process.

Maths Vocabulary: The vocabulary that children should be able to understand and use at each stage of their maths learning is mapped in Maths Progression of Vocabulary outline.

IMPLEMENTATION

Mode of Study

Maths at Debden is taught every day across all year groups – with a minimum study of 5 hours per week.

-The children's main maths lessons take place in the morning, ranging from 45 minutes to 1 hour 10 minutes, depending on the day and the age of the learners.

-Children from year 2 to year 6 also have weekly timetabled opportunities to explicitly develop their mental arithmetic skills (particularly multiplication and division). These are ordinarily 15–30-minute sessions.

-At least 3 times per week for 15 minutes each, children have a 'Maths Meeting' in which they consolidate key areas of mathematics or introduce new topics in your class.

Maths Lesson Structure

Our maths lessons utilise a range of assessment for learning strategies to ensure that all children are appropriately challenged and engaged. The teaching of mathematical concepts follows a 4-point 'explore', 'practice', 'fluency', 'reasoning and problem-solving' sequence.

Explore: We establish what is known/ not known, and look to address any problems/ misconceptions. We discuss why the learning is important, and offer contexts in which the learning is useful.

Practice: We model and scaffold how to overcome problems, before moving through guided practice and independent practice activities. Through this repetition, processes become more secured in the children's long-term memories.

Fluency: Fluency is about being able to apply a skill to multiple contexts and select the most appropriate method for the task at hand. This stage requires a clear variation of questions and activities.

Reasoning and Problem-Solving: Applying logical and critical thinking to a mathematical problem in order to work out the correct strategies to use to find solutions. Children find ways to apply knowledge and skills they have to answer unfamiliar types of problems.

We also incorporate a number of aspects of the mastery approach to mathematics teaching, but with some notable adaptations that have allowed us to achieve strong progress for all children when teaching in mixed-age classes. In a typical lesson, you would expect to see the following strategies/ procedures in use:

-A short-sharp AFL (assessment for learning) activity or some form of knowledge recall session, which is rapidly utilised by teachers to gauge the children's prior knowledge and skills;

-Children who need further support to grasp concepts being provided with information in small steps, clear modelling (often teacher or other students modelling thinking aloud), gradual scaffolding, and guided practice activities to enable them to achieve a high success rate before working independently;

-Children who demonstrate a high success rate in independent practice being swiftly provided with opportunities to challenge and extend their knowledge and skills further, through encountering further fluency and problem-solving activities;

-All children benefitting from intermittent periods of teacher input, guided practice, partner and independent thinking activities in the 'kite flying' style, (groups of children may experience this at different times in the lesson).

-All children being given the opportunity to tackle fluency and problem-solving activities;

-Clear and precise verbal feedback, in the moment marking by teacher, self and/or peer.

General Pedagogical Approach: Across all subjects at Debden Primary Academy, we use teaching strategies drawn from Rosenshine's work on *The Principles of Effective Instruction* and Lemov's recommendations in *Teach Like a Champion*, and this includes within the teaching of art. Some of the most important pedagogical strategies include:

-New Material in Short Steps: The individual components of large-scale works are given in small chunks of new material, ensuring that children's working memory is not overloaded.

-Regular Review: We spend the initial portion of lessons reviewing what has been learnt in prior lessons, terms and years. This helps to commit information to long-term memory.

-No Hands Up/ Cold Calling: We want to ensure that every child is an active participant in their learning, who fully engages and is able to contribute ideas. Cold calling also helps us to gauge what every child in the class understands, in order to tailor our teaching to the children's needs. To allow children to orally rehearse responses, we also provide regular opportunities for talk partners.

-Guided Practice and Independent Practice: Throughout units we aim to progress from practice that is more heavily guided and scaffolded, to more independent practice when a high success rate has been achieved.

Resources

We have acquired subscriptions to both the White Rose Premium and the Classroom Secrets resources, both of which are closely mapped to the White Rose schemes of learning. However, we do encourage all teachers to utilise and adapt a range of resources in order to tailor learning to the children's needs. You may see children working on 'Silver', or 'Gold' activities (decreasing the difficulty) and this enables us to find the right guided and independent activities to progress and secure the children's understanding.

Maths Meetings: Maths meetings consolidate learning outside of core maths lessons and provide an opportunity for pupils to practise applying their knowledge and skills on a regular basis, helping to continually build on their mastery of key concepts.

Maths Meetings help to:

- support areas of the curriculum where pupils may have forgotten key maths concepts
- consolidate learning and help highlight areas where pupils may have any misconceptions
- provide extra time in the day for maths and an opportunity to revisit and practise key skills

All teachers have timetabled in at least 3 slots per week (ordinarily at the end of the school day) in which maths meetings take place.

Automaticity of Number Facts/ Mental Arithmetic Skills

Mental maths involves a group of skills that allows students to understand numbers and their relationships, and to apply this to calculate simple sums in their heads, without verbal or written prompts. It involves remembering important maths facts (such as number bonds or multiplication tables). At Debden Primary Academy, we strongly believe that developing children's automaticity in mental arithmetic calculations is vital to their ongoing mathematical development and ability to access a broad mathematics curriculum. We set clear targets for children's levels of automaticity of number facts by each phase of their learning (see the appendix below, our skills map and knowledge organisers for more information on the targets at each stage).

Mental arithmetic skills are developed throughout all three of the modes of study (maths lessons, reinforced in maths meetings, and in independent mental arithmetic sessions). In the independent sessions, children may encounter timed maths tests, or may be given opportunities to practice their mental arithmetic via a number of our online apps and resources. Times Tables Rockstars, for example, has proven to be a highly-effective and engaging tool for enabling children to become secure in their times tables up to 12 x 12.

Interventions

We take every available measure to try to ensure that all children at the school reach our ambitious targets for developing automaticity in number facts/ arithmetic to enable them to concentrate on higher order thinking in their maths lessons. In the small number of cases in which children do not reach these targets for the respective stage of their learning (ordinarily these are children who have moved from other schools – the context of our school means that there is a higher than average level of transience), we utilise small group interventions in order to prioritise the development of this declarative knowledge. We have created staged interventions for developing addition and subtraction skills using the 'Numbots' software and multiplication and division using the 'Times Tables Rockstars' software (see the appendix for more information on these interventions).

Home Learning

Homework is designed to reinforce the learning that takes place in school. Our homework expectations in maths gradually increase as the children get older, preparing them both academically and organisationally for life in secondary school. Maths homework is largely comprised of children practicing in the following areas:

EYFS

- number bonds- within 10 (sent home as taught)
- number bonds- to 10 (sent home as taught)
- letter and number formation

KS1

- Counting forwards and backwards to 100;
- Counting in 2s, 5s, 10s
- Multiplication tables: 2s, 5s, 10s

KS2

- Multiplication tables: up to 12x tables
- Four operations activities
- Number related facts i.e. inverse

Oracy

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. Children need to learn to explain their thinking clearly and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Inclusion

Debden Primary Academy is an inclusive school, and we fully embrace the entitlement of all children to receive a balanced, broadly-based curriculum. Our predominant approach towards ensuring that all children are included in all maths activities is through a broad arsenal of high-quality teaching methods (see our Teaching and Learning policy). However, we do recognise that these strategies alone are not always sufficient to enable all children reach the expected standards of progress and attainment (particularly those who have specific learning needs or gaps that are difficult to meet in the classroom).

Where children need foundation steps to access learning in class, teachers may 'pre-teach' initial concepts. Where the expected learning has not been secured in the lesson, they may also plan short 'post-teaching' sessions for some children (both of these types of sessions may be delivered by learning support assistants).

To enhance the progress of these children, we run a systematic programme of intervention groups, that are planned, implemented, and continuously monitored on a half-termly rolling cycle. In maths, these may include subject-related interventions such as numeracy tuition, multiplication practice groups and SATs booster sessions.

The progress of children within these intervention groups is more finely monitored (using a range of objective-based tracking systems) to ensure that interventions are having the desired impact on children's progress. These impact measures are communicated with parents at half-termly intervals.

IMPACT

Marking and Feedback

As a school, we use the whole class feedback approach, which teachers carry out on at least a weekly basis for core subjects. This includes highlighting strengths, identifying misconceptions and next steps, and commenting upon the children's presentation. Through this process, the teacher is provided with the information needed to ensure that future learning plans are tailored to the needs of the children. A 'blue sticker task' (the call to action) should be utilised to address misconceptions and learning that has not been secured.

We also recognise that, particularly in maths, the most valuable feedback is often given during a lesson.

Throughout practice and fluency activities, the teacher and learning support assistant may circulate the class and provide in the moment feedback based upon learning attempts. Learning marked by adults should utilise a green pen. Learning is ticked if correct, dotted if incorrect and a comment is only made if/when a teacher feels this is necessary to move learning forward. Children are also encouraged to regularly peer-assess and purple for self-assess learning, which is carried out using purple pens. Guided practice and fluency sessions will often be marked together as a whole class - in these marking sessions children will also utilise purple pens.

Assessment

Outcomes in maths are demonstrated primarily through the children's results in the Key Stage 1 and Key Stage 2 SATs assessments (in reading, writing and SPAG). The value-added measure that these tests provide us with offer the foremost gauge of their academic progress in the subject.

To track children's progress and attainment between these external benchmarks, children sit PUMA tests 3 times per academic year (once in Autumn, Spring and Summer – also on arrival for new children). These tests provide us with a well-rounded understanding of the children's progress and attainment in each area of maths, in order to inform our future planning. We are also able to plot children's exact standardised score against their standardised score at prior checkpoints, to ensure that they are making strong progress. We have high academic expectations of our children, and thus consider PUMA scores of 105+ and 115+ to be representative of a child working at the expected standard and greater depth standard accordingly (we have found that holding these standards enables us to more accurately predict how children will perform in their SATs assessments)

At the end of each maths unit, teachers will often opt to implement the White Rose block assessments. These assessments provide clear evidence of the exact skills and knowledge within a unit of learning that a child has secured, and enables them to spot components that need revisiting.

Monitoring

The subject leader is responsible for ensuring that the implementation and impact of our maths provision are aligned with this policy. 2-3 times per year, subject monitoring of art takes place, which is normally carried out by the subject leader (at times, this may be a senior leader). At least once per year, this is carried out alongside the link Governor for the subject. The subject monitoring process will include a combination of the following:

- Lesson visits;
- Trawl of children's books;
- Student chats;
- Checking of student understanding/ methods against calculation policy;
- Looking at Whole-Class Feedback journals;
- Viewing classroom displays;

-Conversations with teachers;

-Analysis of assessment data;

-Subject leader 'deep-dive' questions and review of key subject documents (when with link Governor).

The information gathered from teachers is fed back in a timely fashion via our subject leader monitoring reports.

REVIEW

The Mathematics policy of the school is regularly evaluated and updated (at least bi-annually) in line with the Curriculum Policy and the School Development Plan.



MATHS ADDITION AND SUBTRACTION INTERVENTION

DEBDEN PRIMARY ACADEMY

Aim: This intervention aims to build children’s addition and subtraction skills to the level expected by mid-KSI.

Rationale: Speed and accuracy in addition and subtraction underpins key learning in mathematics throughout KSI. Children who do not develop fluency in these tables by the correct point in their schooling risk falling significantly behind in all areas of mathematics.

Who is the intervention for? All children who are not sufficiently fluent/ accurate in their times tables at these corresponding points in their education:

Year Group and Term	Skill
Reception	Subitising small numbers
Year 1: Autumn Term	Adding and subtracting 1 & 2 within 20, adding and subtracting within 10.
Year 1: Spring Term	Adding and subtracting within 20
Year 1: Summer Term	Adding and subtracting with simple 2-digit numbers.
Year 2: Autumn Term	Adding and subtracting with harder 2-digit numbers.

Intervention Software: We use the ‘Numbots’ software to build children’s accuracy and fluency in their basic addition and subtraction. All children already have a login and password/ pin for accessing the software. It is downloaded on all of our school iPads.

How does the intervention work?

-Intervention groups have been created on each of the class lists within the Numbots admin section. These intervention groups are named after the respective skills that are being practiced, e.g. ‘Intervention: Stage 1. If children move up (see below) the class teaching team should move the child to the next group.

-Children are assigned a group based on the lowest stage (below) in which they are not accurate:

Stage	Skill	Stage	Skill
Stage 1	Subitising: 1 to 5 (group)	Stage 8	Adding: within 10
Stage 2	Subitising: 6 to 9 (group)	Stage 9	Subtracting: within 10
Stage 3	Subitising: 1 to 9 (10 boards)	Stage 10	Number bonds: to 20
Stage 4	Number bonds: to 5	Stage 11	Adding: across 10
Stage 5	Number bonds: to 10	Stage 12	Subtracting: ones within 20 (not across 10)
Stage 6	Adding: 0, 1 and 2	Stage 13	Adding: within 20
Stage 7	Subtracting: 0, 1 and 2	Stage 14	Subtracting: ones within 20 (across 10)

-At the start of the intervention, take a baseline of the number of questions that children get correct within the time frame. You should also make a record of the amount of questions that they answer incorrectly.

-Children are given resources to aid their practice, and the opportunity to practice during maths meetings throughout the week (and at home).

-After one week, the teacher should again measure their accuracy and fluency. To move up to the next stage, children should achieve **both** 90% accuracy and less than 6 seconds per question.

Records: The sheet for tracking and logging the intervention is shown overleaf.



MATHS ADDITION AND SUBTRACTION INTERVENTION

DEBDEN PRIMARY ACADEMY

Class: <input style="width: 95%;" type="text"/>	Week Beginning: <input style="width: 95%;" type="text"/>
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Student 1 Name: <input style="width: 95%;" type="text"/>			Year Group: <input style="width: 95%;" type="text"/>								
Stage: <input style="width: 95%;" type="text"/>			Skill: <input style="width: 95%;" type="text"/>								
Baseline			Practice (aim for at least 3x per week)					Outcome			
Number Answered	Number Correct	Number Incorrect	Mon	Tue	Wed	Thu	Fri	Number Answered	Number Correct	Number Incorrect	Move up? (yes/no)
Notes:											

Student 2 Name: <input style="width: 95%;" type="text"/>			Year Group: <input style="width: 95%;" type="text"/>								
Stage: <input style="width: 95%;" type="text"/>			Skill: <input style="width: 95%;" type="text"/>								
Baseline			Practice (aim for at least 3x per week)					Outcome			
Number Answered	Number Correct	Number Incorrect	Mon	Tue	Wed	Thu	Fri	Number Answered	Number Correct	Number Incorrect	Mon
Notes:											

Student 3 Name: <input style="width: 95%;" type="text"/>			Year Group: <input style="width: 95%;" type="text"/>								
Stage: <input style="width: 95%;" type="text"/>			Skill: <input style="width: 95%;" type="text"/>								
Baseline			Practice (aim for at least 3x per week)					Outcome			
Number Answered	Number Correct	Number Incorrect	Mon	Tue	Wed	Thu	Fri	Number Answered	Number Correct	Number Incorrect	Mon
Notes:											

Student 4 Name: <input style="width: 95%;" type="text"/>			Year Group: <input style="width: 95%;" type="text"/>								
Stage: <input style="width: 95%;" type="text"/>			Skill: <input style="width: 95%;" type="text"/>								
Baseline			Practice (aim for at least 3x per week)					Outcome			
Number Answered	Number Correct	Number Incorrect	Mon	Tue	Wed	Thu	Fri	Number Answered	Number Correct	Number Incorrect	Mon
Notes:											



MATHS ARITHMETIC FLUENCY INTERVENTION

DEBDEN PRIMARY ACADEMY

Aim: This intervention aims to build children's fluency in their multiplication and division up to 12×12 .

Rationale: Speed and accuracy in these multiplication tables underpins key learning in mathematics throughout upper KSI and KS2. Children who do not develop fluency in these tables by the correct point in their schooling risk falling significantly behind in all areas of mathematics.

Who is the intervention for? All children who are not sufficiently fluent/ accurate in their times tables at these corresponding points in their education:

Year Group and Term	Multiplication Tables
Year 2: Summer Term	2, 5, 10
Year 3: Autumn Term	2, 3, 5, 10
Year 3: Spring Term	2, 3, 4, 5, 10
Year 3: Summer Term	2, 3, 4, 5, 8, 10
Year 4: Autumn Term	2, 3, 4, 5, 8, 10, 11
Year 4: Spring Term	2, 3, 4, 5, 6, 8, 9, 10, 11
Year 4: Summer Term	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Year 5 and Year 6	Children should be accurate up to 12×12

Intervention Software: We use the 'Times Tables Rockstars' software to build children's accuracy and fluency in their multiplication and division. All children already have a login and password/ pin for accessing the software. It is downloaded on all of our school iPads.

How does the intervention work?

-Intervention groups have been created on each of the class lists within the TT Rockstars admin section. These intervention groups are named after the respective times tables that are being practiced, e.g. 'Intervention: 4 times table'. If children move up (see below) the class teaching team should move the child to the next group.

-Children are assigned a group based on the lowest stage (below) in which they are not accurate:

Stage	x tables	Stage	x tables
Stage A	10	Stage G	8
Stage B	2	Stage H	6
Stage C	5	Stage I	9
Stage D	3	Stage J	7
Stage E	4	Stage K	12
Stage F	11	Stage L	All

-At the start of the intervention, take a baseline of the children's accuracy (percentage of answers correct) and fluency (seconds per question). To do this, select the 'garage' setting – this gives children 1 minute to answer as many questions within their given times table as they can.

-Children are given a multiplication square, and the opportunity to practice their times table during maths meetings throughout the week (and at home). They are given a multiplication square to aid them.

Notes: