Swalwell Maths Policy

Academic year	Head teacher	Deputy Head	Assistant Heads	Chair of Governors
2022/2023	Mrs R Hocking	Mr R Warren	Mrs S Leaver & Mrs K McCall	Mrs L Gray

Review Date	Changes made	By whom	Date Shared
March 2020	Yes	AHT KM	March 2020
September 2022	Update dates and staff details	R. Hocking	

1. Curriculum Statement

Intent

The 2014 National Curriculum for Maths aims to ensure that all children:

- Become fluent in the fundamentals of Mathematics
- Are able to reason mathematically
- Can solve problems by applying their Mathematics

At Swalwell Primary, these skills are embedded within Maths lessonsand developed consistently over time. We are committed to ensuring that children are able to recognise the importance of Maths in the wider world and that they are also able to use their mathematical skills and knowledge confidently in their lives in a range of different contexts. We want all children to enjoy Mathematics and to experience success in the subject, with the ability to reason mathematically. We are committed to developing children's curiosity about the subject, as well as an appreciation of the power of Mathematics.

Implementation

The content and principles underpinning the 2014 Mathematics curriculum and the Maths curriculum at Swalwell Primary reflect those found in high-performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China.

These principles and features characterise this approach and convey how our curriculum is implemented:

- Teachers reinforce an expectation that all children are capable of achieving high standards in Mathematics.
- The large majority of children progress through the curriculum content at the same pace. Differentiationis achieved by emphasising deep knowledge and through individual support and intervention.
- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessonsand resources to foster deep conceptual and procedural knowledge.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluencyand understanding of underlying mathematical concepts.

- Teachers use precise questioning in class to test conceptual and procedural knowledge and assess children regularly to identify those requiring intervention, so that all children keep up.

To ensure whole consistency and progression, the school uses the DfE approved 'Power Maths scheme. (This is fully aligned with the White Rose Maths Hub scheme.) A detailed, structured curriculum is mapped out across all phases, ensuring continuity and supporting transition. Our mastery curriculum in mathematics is designed in relatively small carefully sequenced steps, which must each be mastered before pupils move to the next stage.

New concepts are shared within the context of an initial related problem, which children are able to discuss in partners. This initial problem solving activity prompts discussion and reasoning.

In Reception, the initial problem could be introduced through objects, rhymes and images. In short, ten-minute bursts of maths teaching each day with plenty of practice through both guided activities and independent play. An exciting growth mindset and problem solving approach develops mathematical curiosity and resilience. Through beginning Power Maths in Reception it will help to ensure a smooth transition to KS1 and a consistent approach across the whole school from Reception to Year 6.

In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS2. Teachers use careful questions to draw out children's discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, including those already discussed. Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems. Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time. Each lesson phase provides the means to achieve greater depth, with more able children being offered rich and sophisticated problems, as well as exploratory, investigative tasks, within the lesson as appropriate.

Impact

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Students can underperform in Mathematics because they think they can't do it or are not naturally good at it. The

Power Maths programme addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing a growth mindset (see Appendix 2). Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child. This ensures that we are able to promote high standards.

2. Objectives

The National Curriculum identifies three main aims in the primary phase:

- 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.

The National Curriculum states 'Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas.' Therefore, it is organised into distinct domains. However, pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

These domains for KS1 are:

- Number and place value
- Addition and subtraction
- Multiplication and division
- Fractions
- Measures
- Geometry: properties of shape
- Geometry: position and direction
- Statistics (Year 2)

The domains for KS2 are:

- Number and place value
- Addition and subtraction
- Multiplication and division
- Fractions (including decimals and percentages)
- Ratio and proportion (Year 6)
- Measures
- Geometry: properties of shape
- Geometry: position and direction
- Statistics
- Algebra (Year 6)

The distinct domains highlight the important areas of mathematics children need to learn to make effective progress. The Power Maths Scheme ensures that links between the domains are taught and strengthened.

3. Teaching and Learning

A typical lesson using Power Maths lasts approximately 1 hour. Maths is taught daily, usually during the morning. Children begin with a **'Discover and Share'** task in which a contextual problem is shared for the children to discuss with partners. This helps promote discussion and ensures that mathematical ideas are introduced in a logical way to support conceptual understanding.

In Reception, the initial problem could be introduced through objects (concrete manipulatives), rhymes or images, within short, ten-minute bursts of maths teaching each day with plenty of practice through both guided activities and independent play

In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS2. Teachers use careful questions to draw out children's discussions and their reasoning and the children learn from misconceptions through whole class reasoning.

Following this, the children are presented with varied similar problems during the **'Think Together'** section, where we use the model of: I do, We do, You do, during which the teacher will model and pupils have an opportunity to discuss as a class, with a partner or work individually. At this point, scaffolding is carefully reduced to prepare children for independent practice. The children record their working out in their Maths books. The teacher uses this part of the lesson to address any initial errors and confirm the different methods and strategies that can be used. The children

are then shown a 'challenge' which promotes a greaterdepth of thinking.

The class then progress to the **'Practice'** part of the lesson, which is designed to be completed independently. This practice uses conceptual and procedural variation to build fluencyand develop greaterunderstandingof underlying mathematical concepts through problem solving and reasoning. Challenge questions link to other areas of Maths encouraging children to take their understandingto a greater level of depth.

The final part of the sequence is a **'Reflect'** task, as a class. This is an opportunity for children to review,reason and reflect on learning and enables the teacher to gauge their depth of understanding.

4. Assessment

4.1 Assessment for Learning:

Children receive effective feedback through teacher assessment, both orally and through writtenfeedback.

4.2 Formative Assessment:

Short term assessments are part of each lesson. Observations and careful questioning enable teachers to adjust lessonsand brief other adults in the class if necessary. The lesson structure of Power Maths is designed to support this process and the reflect task at the end of the each lesson also allows for misconceptions to be addressed. We use responsive intervention daily to address misconceptions and/or to prepare pupils for the next lesson. At the end of each blocked unit of work, the children complete a short end of unit check. This consists of a few varied questions and an opportunity to demonstrate greater depth. There is a subsequent relatedtask which allows for more open ended outcomes to give furtherindication of the depth of each child's understanding. These mini assessments are recorded in the children's Maths books. Marking and verbal feedback ensure that gaps in understandingcan be addressed before the next unit is taught.

4.3 Summative Assessment:

Teachers administer a termly arithmetic paper and reasoning and problem solving paper which specifically links to the pupil's year group. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parents Evening. On-going teacher assessment and the termly assessments are

used to inform the whole school tracking of attainment and progress for each child. This data will inform whole school and subject development priorities for the next school year.

5. Planning and Resources

The use of Mathematics resources is integral to the concrete – pictorial – abstract approach and thus planned into teaching and learning. The school has a variety of good quality equipment and resources, both tangible and ICT based, to support our learning and teaching. These resources are used by our teachers and children in a number of ways including:

- Demonstrating or modelling an idea, an operation or method of calculation. Resources for this purpose would include: a number line; place value cards; Dienes; money or coins; measuring equipment for capacity, mass and length; bead strings; the interactive whiteboards and related software; 3D shapes and/or nets; Numicon and related resources and software; multilink cubes; clocks; protractors; calculators; dice; number and fractions' fans; individual whiteboards and pens; and 2D shapes and pattern blocks, amongst other things
- Enabling children to use a calculation strategy or method that they couldn't do without help, by using any of the above or other resources as required Standard resources, such as number lines, multi-link cubes, Dienes, hundred squares and counters are located within individual classrooms. Resources within individual classes are accessible to all children who should be encouraged to be responsible for their use. Further resources (often larger items shared by the whole school) are located in the Mathematics Cupboard. An interactive teaching tool for the purpose of modelling strategies is available to all teachers as part of the Power Maths scheme.
- Resources to support teachers' own professional development and understanding of new approaches as part of a mastery approach are available on the Power Maths 'Activelearn' platform. As well as overviews of learning, these include short videos which demonstrate new methods to ensure accuracy. A digital version of the Power Maths textbooks allows these to be shared with the class, during the main teaching.
- Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

6. Organisation

The school has implemented a blocked curriculum approach to the teaching of Mathematics. This ensures that children are able to focus for longer on each specific area of Maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greaterdepth of understanding. Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of Maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2 digit length and width dimensions.

7. EYFS

Children in Nursery have a short daily Maths teaching session, during which time they begin to develop their understanding of simple mathematical concepts such as counting to 20, maintaining 1 to 1 correspondence, simple addition and subtraction facts, to recognise and describe simple 2d and 3d shapes. Children are taught these concepts using physical resources, pictorial resources, songs, games and role-play.

In Reception, pupils will work as a group as concepts are introduced using a range of materials, there would then be a photograph to discuss the concepts further. This would be supported by using concrete manipulatives, followed by active maths games.

In both Nursery and Reception, the independent activities at the Maths table and within the environment will link to the focus for the week.

In addition to these planned independent activities, children also have the opportunity to self-select Maths resources to consolidate their learning during child initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding during their play. Such opportunities are provided in both the inside and outside environment. Regular observations and assessments help to ensure that children that need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

8. Equal Opportunities

The school is committed to ensuring the active participation and progress of all children in their learning; all children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender,

ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.

9. Inclusion

Taking a mastery approach, differentiation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages. The National Curriculum states: 'Children 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.'

Differentiation is through the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with rapid graspers challenged through more demanding problems which deepen their knowledge of the same content. Pupils' difficulties and misconceptions should be identified through immediate formative assessment and addressed with rapid intervention.

Appendices

Appendix 1

Power Maths Structure @

Swalwell **DISCOVER**

Image to explore, discuss. Children work with partner and try to answer question(s). Feedback to class. Completed on whiteboard

SHARE

Teacher to highlight how we solved the discover image. Concrete, pictorially – modelling for children. **(up to 20 mins for Discover and Share)**

THINK TOGETHER (10mins)

I do. We do. You do. Completed in books. Challenge to target the HAP

PRACTICE (20min)

Children working in their books through the 3 aims. This may need to be supplemented with other resources – White Rose, NRich, Third Space, NCETM etc

REFLECT (5min)

Plenary session. What have we learnt? Reflection task

DEEPENING

HAP children. Can be completed as part of CAF marking.

STRENGTHENING

Responsive intervention (in class during assembly) as part of CAF process

Language from video/book added onto slides to encourage pupils to use throughout the lesson.

Questions answered in a sentence (not just words) using mathematical vocabulary

Appendix 2: Power Maths Characters

At the heart of this programme is the idea that all children can achieve and be successful mathematicians with the right growth mindset. It

promotes five child friendly characters, each with their own positive skillset, to inspire and motivate children. These characters are:

We have adopted these characters within school as our characteristics of a mathematician.