



MATHS & CALCULATION POLICY

Clanfield Church of England Primary School

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| Reviewed by: | Maths Lead | Date: 18.10.2021 |
| Authorised by: | Governors – Curriculum Committee | Date: |
| Date of next review (or earlier should legislation require it) | | Date: October 2023 |
| Type of Policy | Curriculum | |

To be reviewed by the curriculum committee on 08.12.2021

Our Maths Curriculum

At Clanfield Church of England Primary School, we teach for a deep understanding of mathematical concepts aiming for all our pupils to develop into confident mathematicians who are curious to explore, question and reason mathematically.

Our approach to teaching mathematics is fully inclusive. We do not believe that our pupils have a fixed ability - so much so that we have eradicated the terms 'low ability' and 'high ability' from our school vocabulary. We believe that all pupils have the potential to become mathematicians through participating in our carefully designed maths lessons.

We have a strong focus on pupils using equipment and maths manipulatives, such as Place Value Counters and Diennes, to secure their understanding of the maths being taught, as well as the ability to calculate fluently. We use the Concrete-Pictorial-Abstract (CPA) approach to support both conceptual and procedural understanding.

We use the White Rose Maths Hub Long Term Plans across the school to ensure we cater for our mixed year classes and complement these with a variety of resources.

Our curriculum provides opportunities for all pupils to reason and problem solve, to articulate their thinking and work on sophisticated challenges both independently and collaboratively. Meaningful feedback, an emphasis on number sense, communication and conceptual understanding to develop mathematical thinking are therefore essential components of our school's approach to learning and teaching in mathematics.

Intent

The 'Intent' of our mathematics curriculum has been derived from the aims of National Curriculum for Mathematics:

- Fluency: 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;
- Reasoning: reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language;
- Problem Solving: 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.

Through our curriculum design, we ensure that all children can develop the mathematical skills and knowledge needed to become confident, responsible citizens. The intention of teaching for mastery is to give all pupils (including those with SEND) access to equitable classrooms; classrooms where pupils can all participate and be influential, and classrooms where pupils are encouraged and supported to develop a deep connected and sustained understanding of the mathematics being explored.

Implementation

Whole Class Teaching

Our priority as a school is to ensure that all children are offered access to appropriate, age related curriculum content, regardless of background or needs. Differentiation for learners is highly reactive and responsive to the needs of children at any particular moment in time and in any particular lesson. With this approach, children receive varying levels of support from lesson to lesson and no child is pigeonholed into a preconceived learning group. Challenge is for everyone and not the reserve of the children previously known as 'higher attaining'. This approach reflects the deep belief that all our children are capable of grasping the learning if we put in place strategies to allow them to do so.

Differentiation is likely to appear very subtle; varied use of practical resources/models and images, plus questioning that requires deeper reasoning, are used to ensure that all children are supported/challenged appropriately. Practice and consolidation play a central role in pupils' learning experiences and teachers build in time for this within their sequence of lessons.

We are aware that some children will have gaps in their pre-requisite knowledge. Consequently, in lessons, teachers use precise and purposeful questioning to check conceptual and procedural knowledge.

Lesson Design

Our Maths curriculum is designed with the principles of a mastery approach in mind. Each lesson is designed to flow cohesively from one to the next, building up knowledge and extending thinking from the previous lesson's learning objective. Lessons are planned using a small step approach where teachers break down learning into small manageable steps which deepen understanding. These small steps are used to reach the overall year group objectives from the National Curriculum.

Medium Term Plans taken from the White Rose Hub for mixed aged classes ensure that the relevant knowledge and skills are being taught in each year group. Possible misconceptions are identified and addressed within lessons and used skilfully to deepen children's mathematical understanding.

Structure of lessons

Children start each lesson by revisiting prior learning, making revisions to their work and working on next steps. The teacher then guides the children through flows in small steps allowing children to see standard and non-standard examples, to reason and to problem solve. Variation is a key element to maths lessons whereby children are exposed to the same principle in different representations. Lessons are designed to draw children's attention to the key learning and follow a kite approach. Teachers use partner talk to enhance reasoning and increase engagement. The use of "I support..." and "I challenge..." ensures that all children reason throughout the lessons. Stem sentences are used to help children understand concepts and to enable them to use the correct vocabulary needed to reason when problem solving. During maths lessons, key representations and concrete resources are used to reduce extraneous cognitive load and to show the underlying mathematical concept.

Impact

Through carefully designed lessons the children become increasingly confident in their understanding of mathematical concepts, calculations and at making connections within the subject.

They are able to articulate why it is important to be fluent and efficient mathematicians and how maths will help them in life beyond school.

The children will have a strong 'number sense' and solid mathematical foundations on which to build and develop further learning. They will have a good conceptual understanding and good procedural ability in tackling calculations and mathematical problems.

Assessment

The children will have opportunities to self and peer assess during the course of each week. The teacher will continually assess the children throughout the week, and this may be through targeted questioning, group or individual support, whole class assessment for learning as well as more summative assessments at the end of each unit of work. The school use the White Rose Hub end of unit assessments for each year group as well as the end of term assessment materials. NFER assessments for Maths are also in place at the end of the autumn, spring and summer term. Assessment results, as well as teacher judgements based on children's work and performance, are then recorded and the data is collected and analysed during pupil progress meetings, which aim to identify the next steps and support needed for the children within a class.

See also, Feedback and marking Policy.

Calculation Policy

Children are introduced to the processes of calculation through concrete, oral and mental activities. In order to develop **conceptual understanding** and **fluency** in the fundamentals of mathematics, children begin by using manipulatives to represent different calculations and processes. As their confidence and conceptual understanding builds, they move to using pictorial (models and images) representations to represent calculations and then the abstract - the written calculation. We call this the CPA approach. We aim for our children to be able to use the most efficient way of calculating available to them to develop them into fluent and confident mathematicians. The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. Through exploring maths equipment and using tangible resources, the children develop a strong 'number sense' which again supports their conceptual understanding and builds firm mathematical foundations.

By the end of Year 6, children will be equipped with efficient mental and written calculation methods, which they use with fluency. Decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. At whatever stage in their learning, and whatever method is being used, children's strategies must still be underpinned by a secure understanding and knowledge of number facts that can be recalled fluently.

The overarching aims are that when children leave our school, they:

- Know why mathematics is an important part of their learning and how it can practically help them in life beyond school
- Can recall number facts with fluency
- Have developed conceptual understanding by being able to visualise key ideas through experience with practical equipment and visual representations;
- Are confident to reason using the language of 'support' and 'challenge';
- Have an efficient, reliable, written method of calculation for each number operation that they can apply with confidence when undertaking calculations that they cannot carry out mentally;
- Can make connections between all four number operations, understanding how they relate to one another, as well as how the rules of arithmetic can be applied.

Please refer to the White Rose Maths Calculation Policy (on our website – Maths page) for an overview of the different models and images that support the teaching of the key concepts. These provide explanations of the benefits of using the models and show a clear link between the four operations.

Key Instant Recall Facts

KIRFs (Key Instant Recall Facts) are designed to support the development of the mental skills that underpin much of the maths work in school. They are particularly useful when calculating, be it adding, subtracting, multiplying or dividing.

An important part of maths development has always been rote learning of certain maths facts. For many years this has included practising times tables and addition facts, such as number bonds and doubles. Each half term children are assessed on Key Instant Recall Facts (KIRFs) that are taught in school but also practised at home.

The aim is for the children to know these facts thoroughly and recall them instantly. Whilst children have a wide range of abilities in mathematics, the KIRFs are designed to be a set of facts that need to be learnt thoroughly as they build on each other year on year.

Appendix 1

Principles of Teaching Mathematics - Guidance for staff

At Clanfield CE Primary School we use a Mastery approach to teaching. This means that:

- We teach each class together as a whole, regardless of prior achievement
- We believe that every pupil has the potential to achieve in every lesson
- Our lessons feature the principles of mastery teaching, including opportunities to practice, variation of standard and non-standard problems, opportunities to develop fluency of key facts and concepts, and opportunities to reason and problem solve through the use of sophisticated problems.
- We support through the CPA approach and adult support where necessary

Teaching assistants must have an active role in maths lessons, with allocated pupils, or pupils to support. They should be aware of what the lesson aims to achieve and how they are expected to support the learning.

Teaching and Learning expectations:

- All equipment will be ready to use at tables, including writing pens/pencils, books, specific maths equipment in advance of the lesson
- Set expectations for learning behaviours before the lesson begins
- Clarify new vocabulary/understanding of vocabulary - this should be clear on each PowerPoint slide.
- Pupils remain in set places unless otherwise directed
- Focus is on deep learning, not on pace.
- Deepen pupils' learning through directed questioning
- Encourage high standards of presentation in books
- Support pupils' independence, allow thinking time to answer questions, value every contribution
- Use CPA approach to deepen understanding and explain a concept
- Strive for every pupil to be achieve the Learning Objective

Consider whether each of your lessons includes:

- Learning Objective
- Key vocabulary and sentence stems
- Fluency practice and keeping key facts on the boil
- Revisiting content and retrieval practice (regular quizzing)
- Misconceptions and mistakes to address and correct
- Sophisticated problems to solve
- Opportunities to reason both verbally and in writing (KS2)
- Structured group/partner talk
- Purposeful verbal and written feedback (from adults and pupils)