



Starting the journey well

As a Church of England community school, we
believe we can impact God's world for good,
grow in learning, love, wonder and faith and
seek together to flourish in the fullest way possible

Mathematics Policy 2022-23

Review Date: January 2023

Intent

At Christ Church primary school, we want *all* children to feel successful at mathematics. With a mastery approach, targeted interventions and a 'small steps' progressive curriculum, we believe that all children have the potential to deepen their understanding and achieve in mathematics. Mathematics needs to be a balance of fluency and reasoning and with high quality teaching and modelling, we aim to give children the skills to succeed at both.

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.

Teaching and Learning: The 'Mastery' Approach

The teaching and learning of mathematics at Christ Church Primary should include aspects of the following Mastery approach strategies in every lesson or over a series of lessons.

Concrete, pictorial, abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths.



Concrete

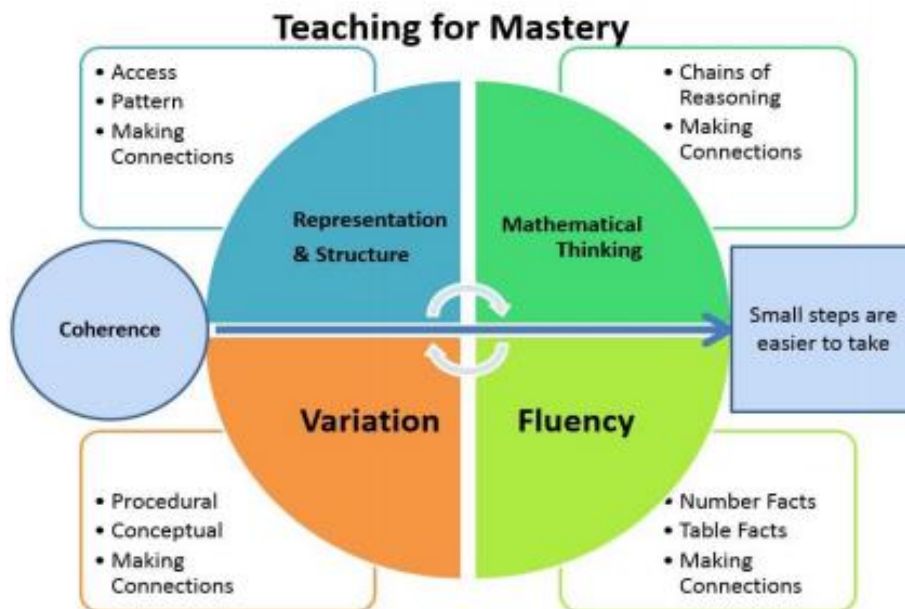
Concrete is the 'doing' stage, using concrete objects to model problems. Instead of the traditional method of mathematics teaching, where a teacher demonstrates how to solve a problem, the CPA approach brings concepts to life by allowing pupils to experience and handle physical objects themselves. Every new abstract concept is learned first with a 'concrete' or physical experience. For example, if a problem is about adding up four baskets of fruit, the pupils might first handle actual fruit before progressing to handling counters or cubes which are used to represent the fruit.

Pictorial

Pictorial is the '**seeing**' stage, using **representations of the objects to model problems**. This stage encourages pupils to make a mental connection between the physical object and abstract levels of understanding by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem. Building or drawing a model makes it easier for pupils to grasp concepts they traditionally find more difficult, such as fractions, as it helps them visualise the problem and make it more accessible.

Abstract

Abstract is the '**symbolic**' stage, where pupils are able to use **abstract symbols to model problems**. Only once a child has demonstrated that they have a solid understanding of the 'concrete' and 'pictorial' representations of the problem, can the teacher introduce the more 'abstract' concept, such as mathematical symbols. Pupils are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols, for example +, −, x, / to indicate addition, subtraction, multiplication, or division.



Fluency

Fluency comes from deep knowledge and practise. This is the first stage of a pupils' understanding. When assessing pupils, if a child is fluent in a concept, (usually when there are least three examples of independent working in the maths book) this will be recorded on the termly assessment sheet. Fluency includes: **conceptual understanding, accuracy, rapid recall, retention and practise.**

Accuracy - Pupils carefully completing calculations with few or no errors.

Pace - Pupils are able to quickly recall the appropriate strategy to solve the calculation and progress through a number of questions at an age appropriate pace.

Retention - Pupils will be able to retain their knowledge and understanding on a separate occasion to when the concept was first introduced.

Practise - The key to fluency is deep knowledge and practice and making connections at the right time for a child.

Reasoning

Verbal reasoning demonstrates that pupils understand the mathematics. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking. At Christ Church, children are encouraged and supported to voice their thought processes because the way children speak and write about mathematics transforms their learning. A mastery classroom should be filled with the sounds of discussion and debate!

Mastery approaches use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary. At our school, **talking is fundamental** (oracy) and to encourage talk in mathematics, teachers ensure that all children have access to new concepts by including sentence stems and key words. Pupils should be able to say not just what the answer is, but **how they know it's right**. This is key to building mathematical language and reasoning skills. We have high expectations of the children to then use mathematical language to explain their reasoning - at first verbally and developing their confidence, then written explanations as part of next step/feedback marking. Key phrases should be collected, discussed and displayed so children can then access them independently. We want all children to be included Mathematics at Christ Church so key words are given to EAL students in their home language and in English.

Oracy opportunities at Christ Church:

- Show me how to complete the calculation
- Teach your friend how to complete the calculation
- How do you know which operation to use?
- Why have you chosen this method? Can you think of another way? Which is most efficient?
- How else can you represent this number?
- What have you learnt today? What can you use to help you?
- True or False? How do you know?
- Which one is the odd one out? Why?
- Use the sentence 'because...but...so' to explain your thinking

Problem Solving

Mathematical problem solving is at the heart of the Mastery Approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding.

Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations.

Problem solving is more than just word problems but the RUCSAC approach can be applied to this style of question:

- 1) Read the problem
- 2) Understand the problem by underlining or discussing: What is the problem about?
- 3) Choose the operation required, the number facts or the approach.
- 4) Solve – the problem by completing jottings on the page
- 5) Answer – complete the answer to the problem
- 6) Check – have I correctly answered the given problem or is there another step?

Teaching and Learning: Implementation

Lesson Structure

At Christ Church, children are taught in a through a balanced mix of independent work, partner tasks and whole class teaching. The mastery approach starts from Nursery as part of a integrated mathematics curriculum. In Reception are taught in mixed ability groups and also follow a 'mastery' curriculum which has an emphasis on number. Mathematics is taught for at least one hour per day (or five hours per week). However, when required, teachers may choose

to include additional mathematics lessons in their weekly timetable. Learning times-tables, for example, might be done during a different part of the timetable. Spending a short time every day on these basic facts quickly leads to improved fluency and this is an important step to developing conceptual understanding through identifying patterns and relationships between the tables. In addition, teachers (as part of their provision mapping) organise intervention groups for children working below the expected level and need short and targeted lessons to help fill the gaps in their knowledge.

Planning

Teachers from Nursery through to Year 6 follow a mastery approach and use planning and resources which support a 'small step' learning journey. Each year the learning builds from children's understanding of number and place value. Reception, year 1 and year 2 have supplementary 'Mastering Number' (as designed by NCETM and approved by the DFE) as at Christ Church we understand how important the development of 'number sense' is early on in a child's education. At the start of each unit and using a plethora of high-quality mastery resources, (White Rose, Third Space, LBQ and NCETM) teachers map each unit learning journey on a medium term plan (MTP). They carefully consider when and how various methods and concrete resources, target vocabulary and sentence stems will be introduced. They also plan provision for children who aren't working at the age expected level (this includes SEN/D and EAL children).

A well thought out MTP, allows teachers to spend their PPA time resourcing their lessons, reflecting on assessments with gap analysis, creating high quality next steps and researching mastery approaches for their next unit – rather than writing overly-detailed plans.

Teaching

On a daily basis, teachers should target their teaching at the majority of the learners and where possible keep the objective the same for everyone. They should plan to support lower ability learners with resources, alternative mathematical methods and/or extra adult support as well as extending the higher ability children with extension tasks and higher order thinking questions. Higher ability children shouldn't simply move to the next year group's objectives but instead they should have a chance to 'deepen' their understanding. Children who are not working at their age expected level can however, move to the objectives from the year group below.

Assessment: Impact

The teaching and assessing of mathematics at Christ Church follows a learning cycle of: plan, teach, review, assess. Gap analysis from formal assessments should inform the immediate teaching afterward. Children's work is marked in the lesson as part of our policy so misconceptions are quickly rectified. In the upper school year groups (3-6), misconceptions can be unpicked and retaught with precision when using the programme 'Learning By Questions' (LBQ) which allows teachers to see gaps in knowledge in 'real time' during the lesson – not after the lesson has finished. The impact of this is that the whole class stays on track with the learning journey and if children need further teaching to reinforce the correct method, these small intervention groups can be picked up on the same day (best practice) or soon after.

KS1 and KS2 Assessment

Summative arithmetic and reasoning and problem solving papers are completed on termly basis. Children from 2-6 will also complete a yearly TT Rockstar baseline test. Years 2 and 6 undertake a range of preparation SATS assessments over the course of the year.

In line with the KS1 and KS2 SATs, the following is a guideline:

- KS1 – Year 1 - a consistent score of approximately 60% (15/25) would indicate 'Expected' and 85% (21/25) would indicate 'Greater Depth'.
- Year 2 - a consistent score of approximately 60% (21/35) would indicate 'Expected' and 85% (30/35) would indicate 'Greater Depth'.
- KS2 - a consistent score of approximately 55% (28/50) would indicate 'Expected' and 86% (43/50) would indicate 'Greater Depth'.

After the assessments are complete, teachers will use a gap analysis to inform planning and fix any misconceptions before moving into the next unit. At the end of each term class teachers meet with the SLT for a Pupil Progress Meeting to share data, identify and discuss target children who are working at an 'emerging' or 'developing' level or are considerably below their age related expectation. These pupils are then placed into an intervention group with a SMART target.

Formative assessment that should inform planning includes: daily questioning, oracy activities, partner work, self assessments checklists (especially for multi-step written methods), independent written work, reviews from LBQ, Timetable Rockstar Paper assessment, end of block assessments and daily marking and regular next step feedback marking.

