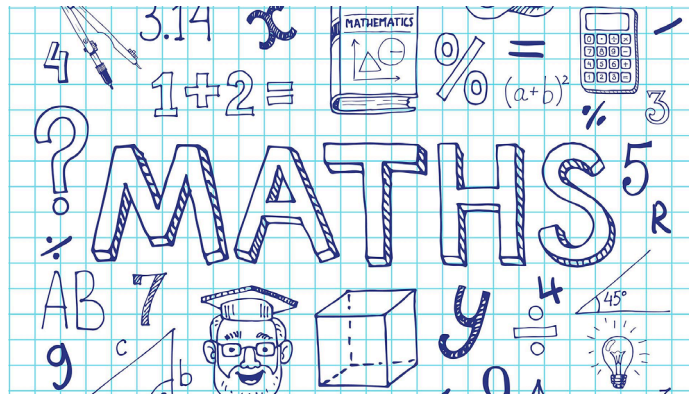


St Gregory's Catholic Primary School



'Loving and Learning'

The St Gregory's Curriculum



Mathematics

Deuteronomy 1:11 May the Lord, the God of your ancestors, increase you a thousand times and bless you as he has promised!

Catholic Social Teaching

Distributive Justice.

Catholic School Pupil Profile

Curious. Discerning. Eloquent.

Curriculum Intent for Maths

The aim of mathematics at St Gregory's is to provide children with the skills and confidence to become fully rounded and secure mathematicians. Based on the assessed need of our children, teachers will provide children deep learning opportunities, where they can experience procedural learning through a variety of known and unfamiliar ways. We intend to achieve these aims through the directive

of small conceptual steps, combined with procedural taught knowledge, that will eventually lead to a deep learning and understanding for our children.

Goals:

1. Teach skills and concepts through the trifecta of arithmetical fluency, reasoning and problem solving, each working in unison to make children fluent in the understanding and application of mathematics.
2. Through ongoing assessment, provide children with tailored lessons so that they can become instrumental in their understanding (knowing what to do) to then deepening that learning to the extent that they become rational thinkers in mathematics (knowing why we do it). This process of development from procedural fluency to conceptual fluency is what determines how we plan through the trifecta mentioned previously.
3. Make children aware of the mathematical trajectory they are on. Understand how key concepts and understanding are built from prior knowledge, and stress the importance of attaining mastery in the key skills which are transferred across multiple aspects of mathematics, year groups, and key stages. Think about the child's schema of knowledge when introducing concepts. What knowledge are they likely to have and use? What will they need that will be new? How do we make this become a part of their schema?
4. Teach concepts through concrete, pictorial and abstract ways. Know and understand the important concrete and pictorial plays in being able to bridge the gap between physical visualisation to mental abstraction.
5. Successful teachers at St Gregory's will spend more time guiding children through their practice, asking key questions, checking understanding and correcting misconceptions and errors. Only when the teacher is satisfied through AFL will they set the children off to explore the concept and variation on their own.
6. Teach mathematics through a mastery approach using the agreed lesson structure. Provide opportunities for children to 'unpick' learning so that lessons become pupil-led, with the role of the teacher acting as a facilitator to guide children to those necessary ends.
7. Teach 5 hours of mathematics per week with opportunities for algorithmic revisiting built in, where appropriate, to the beginning of lessons or start of new units.
8. Ensure teachers have the pedagogical skills and freedom to teach skills in the best way for their children, including being able to identify the previous skills acquired, where common misconceptions will arise, and how they will deepen children's understanding of a concept.

Curriculum Implementation for Maths

In KS1 teachers will use the 'what we do when' timetable, which sequences the NCETM spines across the three terms.

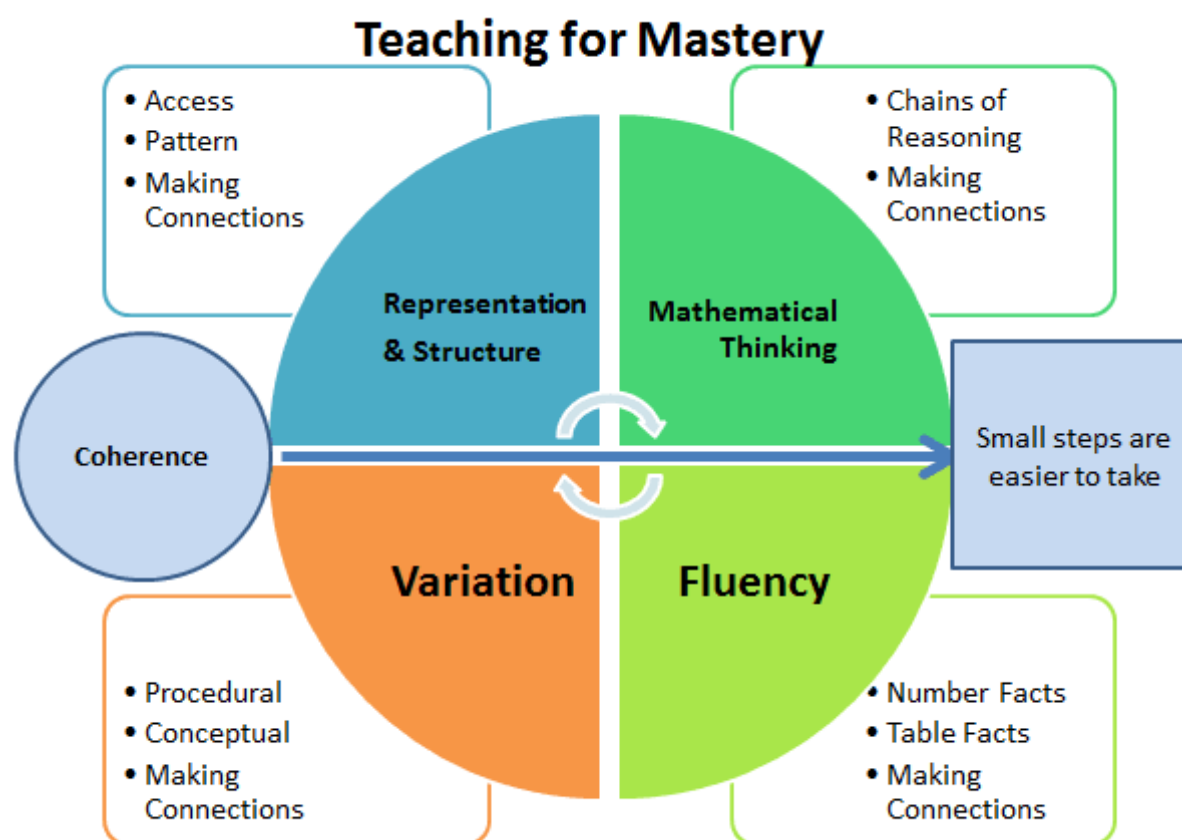
When children enter KS2, the 'what we do when' timetables will be formulated from the White Rose materials to follow the sequences. Built in across both key stages is the flexibility for teachers to adapt the length of these areas of learning, determined by whole class understanding of particular area.

Mastery through spines (Ks1)

What We Do When					
	Autumn 1	Autumn2	Spring 1	Spring 2	Summer 1
Y1	<p>Spine 1.1 comparing quantities and measures</p> <p>Spine 1.2 What is a whole, what is a part?</p> <p>Time (in routines) - quicker, slower, earlier, after.</p>	<p>Spine 1.3 making number 0-5</p> <p>Spine 1.4 making numbers 6-10</p> <p>Time (in routines) - before, after, next, first, today, yesterday, tomorrow, afternoon, evening.</p>	<p>Spine 1.5 additions - how many altogether?</p> <p>Spine 1.6 addition stories</p> <p>Time (in routines) - days of the week, weeks, months and years.</p>	<p>Spine 1.7 addition and subtraction up to 10</p> <p>Spine 1.8 multiples of 10</p> <p>Time (in routines) - hours, minutes and seconds.</p>	<p>Spine 1.9 numbers 20-100</p> <p>Spine 1.10 number 11-19</p> <p>Time - telling time to the hour and half hour.</p>
Y2	<p>Spine 1.11 bridging 10</p> <p>Spine 1.12 difference</p> <p>1.13 2-digit and 1-digit numbers</p> <p>Time - intervals</p>	<p>Spine 1.14 2-digit numbers and multiples of 10</p> <p>Spine 2.2 equal groups</p> <p>Spine 2.4 groups of 10 and 5</p>	<p>Spine 2.3 2 times table</p> <p>Spine 2.5 doubling and halving</p> <p>Spine 2.6 division</p> <p>Time - tell and show the time</p>	<p>Spine 2.5 doubling and halving</p> <p>Spine 2.6 division</p> <p>Geometry - properties of shape</p>	<p>Spine 3.0 introducing fractions</p> <p>Spine 1.15 adding 2-digit and 2-digit numbers</p> <p>Spine 1.16 subtracting 2-digit and 2-digit numbers</p>

What is math mastery?

Maths Mastery should enable a culture of learning to sufficiently:



- embed mathematical understanding
- deepen mathematical understanding
- make connections in mathematical understanding
- and develop a conceptual fluency in mathematical understanding

Coherence

In order for children to achieve mastery of the curriculum they need to embark on a detailed, conceptual journey through their primary mathematics with a sustained reinforcement of mathematical relationships and connections. We call this quality: coherence. Coherence is the small steps taken to understand a mathematical concept.

Structure for building coherence through our primary mathematics curriculum

Anchor Tasks

This is a hook question that will be rooted in the skill being taught and provides a great opportunity for the teacher to assess learning. It is a task which should have a low threshold and high ceiling meaning that it should be able to be accessed by all children, but also can be manipulated to challenge all learners through the level of

questioning. Children will be encouraged to represent their ideas in concrete, pictorial and abstract representations while explaining their reasoning through sentences. Throughout these stages there will be opportunities for children to access questions at a greater depth that will require them to go deeper into their knowledge and understanding.

Structure Reveal

This is where a back and forth discussion takes place between the teacher and the class. Misconceptions are revealed, representations are discussed and evaluated and a structure is revealed in a desirable way to answer the question. This part of the lesson requires sufficient modelling so that the structure can be embedded and understood by all. The teacher might use misconceptions in children's work to reveal a correct structure to the class. They will also provide sufficient STEM sentences that will be read individually and then chanted as a class to embed understanding of mathematical vocabulary and terminology.

Variation - 'Let's Twist It'

Once the structure has been revealed and understood the children should be exposed to variations within how the structure/skill can be represented, or how questions can be varied. Children will be asked to take their learning further by using what they know within a new context that can appear to be unfamiliar. It is here that children might be encouraged to journal their thoughts independently, suggesting how the structure is different, or explaining how they understand the conceptual variation based on what they already know.

Fluency

It is important that before intelligent practice is undertaken by the children that the teacher reinforces the fluency required to access the questions so that the mind can be free to think about concepts. Key here is the aspect of repetition of 'I say..' 'You say..' 'You say..' 'You say..' 'We all say...'. This technique enables the teacher to reinforce the sentence stem for children to communicate their ideas with mathematical precision and clarity. These sentence structures often express key conceptual ideas or generalities and provide a framework to embed conceptual knowledge and build understanding. For example:

"If the whole is divided into three equal parts, one part is one third of one third of the whole."

Having modelled the sentence, the teacher then asks individual children to repeat this, before asking the whole class to chorus chant the sentence. This provides children with a valuable sentence for talking about fractions. Repeated use helps to embed key conceptual knowledge.

Application Of Thinking - 'Intelligent Practice'

"In designing [these] exercises, the teacher is advised to avoid mechanical repetition and to create an appropriate path for practicing the thinking process with increasing creativity."

These are the independent tasks created by the teacher that will build on the initial idea/concept/knowledge/sentence STEM and incorporate these into varying representations and ideas that will seek to increasingly challenge the children to use and develop their understanding and explain their reasoning.

Before this part of the lesson teachers and support staff should have identified those who are struggling with concepts or attaining fluency and have those selected children in a group to go over their misconceptions while the rest of the class work independently.

Challenge - Dong Nao Jin

Throughout these stages there will be opportunities for children to develop depth through 'Dong Nao Jin' questions that require a deeper level of thought. Dong Nao Jin can take the form of a 'challenge', a 'trap' for students, a very 'tricky' question, or an opportunity for the students to think about the knowledge in another way.

Curriculum Impact for Maths

Fluency, reasoning and problem solving will underpin all lesson content created and delivered by teachers. Rather than fluency being taught to provide opportunities for children to reason and problem solve, teachers will plan and teach with an awareness that each is codependent on the other two and all three work together to enable true fluency and mastery of the subject.

Procedural fluency will be routinely reintroduced to ensure key skills are committed to long term memory, adding to the child's overall schema of procedural understanding.

Teachers will be aware of the hierarchy of reasoning and will use this as a basis to assess the depth at which a child understands a particular concept through fluency and problem solving.

Level 1: Reason what you are doing

Level 2: Justify why you are doing it

Level 3: Communicate to others why you are doing it this way

Level 4: Present a proof as to why this is the case

Problem solving will form part of most lessons and will be used to deepen a child's understanding of the application of their methods of calculation and approaches.

Problem solving questions should be seen as questions in which children do not have ready made solutions, but are asked to explore the possible ways, frequency of outcomes, or number of solutions to something.