Sacred Heart Catholic Primary School

Mathematics Overview

"Too often we give children answers to remember rather than problems to solve."
Roger Lewin
"In mathematics, the art of proposing a question must be held of higher value than solving it."
George Cantor
"Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country."
David Hilbert

At Sacred Heart, we believe that Mathematics is essential to everyday life. It provides a foundation for understanding the world, enabling us to appreciate relationships and patterns in both number and space.

Our aims for mathematics are:

- for all pupils to become confident, fluent and resilient mathematicians, empowering them to reason and solve problems in a range of contexts,
- for all pupils to develop a sense of enjoyment and curiosity about the subject
- for all pupils to be effective communicators both in written and verbal responses, active contributors within class and when representing the school within the community,
- for all pupils to be independent learners who show the necessarily skills of resilience and problems solving to achieve their goals
- for all pupils to be healthy in mind and body

As a school, we are looking to embed a mastery approach to teaching and learning using 'Singapore style' maths. Singapore has consistently ranked amongst the highest countries in the international PISA tests due to their world-renowned methods in the teaching of maths.

We believe that every child can succeed in maths and we aim to instil this belief in the children themselves.

Intent

Our Mathematics Curriculum has been developed based to ensure a full coverage of the Mathematics Programme of Study detailed in the National Curriculum 2014 (see below for documentation). It is delivered through a coherently planned and sequenced programme based on the National Curriculum and the Early Years Foundation Stage through the use of the Mastery approach

Our mathematics curriculum is designed to ensure learner:

- become fluent in the fundamentals of mathematics
- develop a deep conceptual understanding, and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by conjecturing relationships and generalisations, and proving their understanding using mathematical language and representations
- have the opportunity to solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication
- are guided to break down problems into a series of simpler steps and persevere in seeking solutions.

The school follows the White Rose Mathematics scheme of learning. This scheme of learning details a sequence of small steps which build progressively on one another. Each year group has a scheme

of learning which includes an overview of the mathematics the child will be learning through the year.

Each year is split into three terms (autumn, spring and summer), and each term comprises individual blocks of learning about a particular topic. The approach focus time on building strong number skills in Key Stage 1 and Key Stage 2. This is because these are essential core skills which lay a solid foundation for more complicated learning later on.

Implementation.

The principles of Teaching for Mastery, a product of extensive research into the highly successful teaching practice in Singapore and Shanghai, are used throughout the school

At Sacred Heart, the Teaching for Mastery is broken down into 3 strands and defined as:

Fluency: *A fundamental of mathematics, including 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: *The bridge between fluency and problem solving. The use of language to explain and justify their methods and choices allows children to use the former to accurately carry out the latter.*

Problem Solving: *Applying fluency to a variety of problems with increasing sophistication, including breaking down problems into simpler steps and persevering in seeking solutions.*

A whole class teaching approach is adopted, keeping the class working together, with no acceleration to new content. This is to avoid superficial, surface learning and foster a deep, secure understanding of all the concepts taught. The learning needs of every child are addressed through skilful questioning and appropriate, immediate intervention – this provides the necessary scaffolding or challenge for all.

Every lesson provides opportunities for children to recall and apply knowledge rapidly and accurately as well as reason and solve problems. Children solve the problems using the C-P-A approach and after exploring their own methods they are guided towards the most efficient approach.

Children spend time in lessons working independently or with partners to support articulation of their ideas before showing deep understanding with independent work. They are encouraged to discuss their reasoning using key mathematical vocabulary.

Our Mathematics curriculum has been further developed so that Mathematics is taught through the use of the concrete-pictorial-abstract (C-P-A) approach, thereby giving our pupils a deeper understanding of mathematical concepts.

Our expectation is that the majority of children will move through the programmes of study at broadly the same pace. Pupils who grasp concepts rapidly will be challenged by being offered rich reasoning and problem-solving activities. Those who are not sufficiently fluent will be offered additional practice to try and close any gaps in understanding. Intervention sessions are led as soon as possible after the lesson.

In our reception class, children work towards the Early Learning Goals for Number and Shape, Space and Measure. Teaching adopts the Teaching for Mastery principles where appropriate and builds this into the unique pedagogy for the EYFS.

The Key Stage One and Key Stage Two curriculum focuses on four areas: number, measurement, geometry and statistics across the year. Within these areas, concepts are taught sequentially in small

steps and at great depth to ensure the learning is secure and sustainable. Topics are taught in a structured order to ensure learning is built on prior learning and to ensure connections are created between the topics. Included in every lesson are fluency, reasoning and problem-solving tasks, giving the children the opportunity to explore the concept being taught extensively before moving on to the next. Questions are designed carefully by the teachers to provide intelligent practice, developing and embedding conceptual fluency. We believe in exposing the children to multiple representations of a concept, using concrete, pictorial and abstract examples simultaneously to support the children's understanding and meet the cultural capital needs of differing cohorts. Pupils who need additional support may also receive a structured intervention overseen by the Inclusion Lead.

As a school. we place importance on mathematical talk, and lessons regularly include opportunities for pupils to discuss their understanding and explain their thinking, both with the adults and their peers. Accurate use of high level vocabulary and terminology features prominently, with teachers both modelling and expecting mathematical language to be used by the pupils. We believe this will support our children when faced with a range of mathematical problems.

Impact

All pupils at Sacred Heart will perform highly at the end of their key stage for Mathematics:

- Early Learning Goal
- Key Stage 1 Outcomes
- Key Stage 2 Outcomes

2022 – EYFS – GLD = 80% Mathematics ELG – 95%
2022 – KS1 – EXS + = 84% Greater Depth – 32%
2022 – KS2 – EXS + = 78% Greater Depth Standard – 30% Scaled Score - 104

Our maths attainment scores for achieving the expected level are consistently above the national average across the school.

Children achieving greater depth standard at the end of KS2 is consistently above the national average.

- Monitoring shows good evidence of staff subject knowledge and understanding of the mathematical concepts being taught.
- Staff are developing their planning for small steps progression between tasks and concepts and allowing pupils to make connections in their learning.
- All learning is matched appropriately to the age group being taught.
- Our pupils' work in books consistently shows evidence of opportunities for arithmetic, fluency and problem solving.
- Staff are developing their planning to develop pupils reasoning skills and the language they use to explain

More Information:

If you were to walk into lessons at Sacred Heart, you would see:

- Concrete, pictorial and abstract (CPA) representations are used fluidly to allow deep, sustainable learning for all.
- Recapping of previous learning to help children retain and build on prior knowledge and skills.
- Questions are carefully planned and used throughout the lesson to target children's fluency and reasoning skills.
- Children are given opportunities to share and critique answers or strategies.
- Children are encouraged to identify and recognise patterns and rules, rather than just shown how to find the answer.

- Children will be given opportunities to practise and use their number skills, and apply them in different contexts.
- Children are expected to understand and use the correct, precise mathematical vocabulary when explaining their maths.
- Mathematical vocabulary is given high importance.
- Adults in lessons will quickly identify children who are struggling within the lesson.
- Adults moving around the classroom to support and question children to deepen their understanding.

What pupils say about Science at Sacred Heart:

<u>What do you enjoy about Mathematics lessons and what have you achieved?</u>

Year 2 – "*I like that maths is difficult because you get to challenge yourself."*
"Completing work and getting onto challenges."
"Resilience to try again."
Year 4 – *"I enjoy column addition, subtraction and multiplication."*
"I enjoyed learning how to divide with different methods."
"I have got better at time tables, which has helped me with division. I can use the inverse to check my answer."
Year 5 – *"I enjoy learning maths, it is fun."*
"There are a lot of variety of questions and extensions to do."
"I enjoy the challenges of doing difficult questions. I am becoming more resilient."
Year 6 – *"I enjoy the problem solving because it gives your brain a workout."*
"I enjoy how it builds up to the harder stuff – we are challenged but not so much that we don't get it."
"BODMAS makes everything simpler."
"Lots of work on decimals which I didn't understand last year but now I can see how you work them out."

<u>What do you think has helped you to learn in mathematics this year?</u>

Year 2 – *"Recap for starter."*
"Presentations."
"Using whiteboards for group challenges."
Year 4 – *"Using whiteboards for starter activities."*
"Listening to my teachers and making sure I remember what I have been taught."
"Time tables practise."

Year 5 – *"Powerpoint slides that are easy to understand."*
"Explanations that are visual which helps me to see clearly – eg bar models."
"Use of practical and simple language in the lessons to help explain what's being taught."
Year 6 – *"The teachers have helped us to learn."*
"The work which builds up in different ways."
"We do lots of practise questions."

<u>How have you been challenged in mathematics this year?</u>

Year 2 – *"Remembering past topics."*
"Column addition and subtraction but lots of practise which has given me confidence."
"Challenges after initial week."

Year 4 – *“*

Year 5 – *“Lots of extensions to do.”*
“Challenging questions.”
“We have been learning a lot of different maths topics in a short time.”
Year 6 – *“Good balance between easier and harder questions so we can all do it and have a go.”*
“Our extension maths sessions have been challenging but lots of fun too.”

What is yoru favourite aspect of mathematics?

Year 2 – *“Money, 3D shape, drawing 2D shapes and using shape names in conversation.”*
Year 5 – *“Extensions and difficult questions.”*
“The work that has been set.”
“The teaching.”
Year 6 – *“BODMAS.”*
“The problem solving is the best bit because it stretches our brains and gives us a workout.”
“Doing the fluency stuff because lots of times it follows a process and I like to follow it properly.”
“Lessons are consistent.”