Sacred Heart Catholic Primary School
Mathematics Calculation Policy

Introduction

The rationale behind the adaptation to teaching mathematics at Sacred Heart Catholic School lay within the research and recommendations from NCETM/Maths Hub led Mastery Specialist Programme as well as the National Curriculum Framework, DfE 2014, which state:

- Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas.
- Most pupils will move through the programmes of study at broadly the same pace.
- Pupils 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.

Purpose of the Policy

The mathematics Policy has been written to meet the requirements of the National Curriculum 2014, for the teaching and learning of maths. This policy also includes a section on the recommended progression of calculations to be used by class teachers when teaching the four operations (Part 2: Calculations).

Aims of the Policy

Mathematics helps children to make sense of the world around them through developing their ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and pattern in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

At Sacred Heart Catholic Primary School we aim to:

- recognise and value the importance of nurturing, building and developing all aspects of mathematics for our pupils from their arrival in school to their transition to secondary school
- ensure they are “secondary ready” developing key skills for life. This includes the development of key calculation skills across the curriculum.
- develop a positive attitude to maths as an interesting subject in which all children gain success and pleasure;
- develop mathematical understanding through systematic direct teaching of appropriate learning objectives;
- encourage the effective use of maths as a tool in a wide range of activities within school and, subsequently, adult life;
- develop an ability and confidence in the children to express themselves fluently, to talk about the subject with assurance, using correct mathematical language and
- develop an appreciation of relationships within maths;
- develop ability to think clearly and logically with independence of thought and flexibility of mind;
- develop mathematical skills and knowledge and quick recall of basic facts in line with National Curriculum recommendations
- continually raise the standards of achievement of the pupils in Sacred Heart School.

The mathematics teaching at Sacred Heart School is geared towards enabling each pupil to develop within their capabilities; not only the mathematics skills and understanding required for later life, but also an enthusiasm and fascination about maths itself.

The National Curriculum

The National Curriculum for Mathematics describes what must be taught in each Key Stage and within each year group. This ensures continuity and progression in the teaching of mathematics. We follow the 2014 National Curriculum Framework for maths and other guidance to enable quality learning and teaching to take place.

Mathematics in the Foundation Stage

Work undertaken within the Foundation Stage is guided by the requirements and recommendations set out in the QCA/DfE curriculum guidance and will work towards the Early Learning Goals aiming to meet the statements contained within the goals by the end of Reception year. We give all the children ample opportunity to develop their understanding of mathematics. We aim to do this through varied activities that allow them to use, enjoy, explore, practise and talk confidently about mathematics. In Reception the daily routine will include planned and spontaneous activities that include:

- a wealth of opportunities to develop and cultivate basic maths number sense
- experiences that allow understanding and application of maths concepts both indoors and outdoors.
- sharing and enjoying a range of rhymes and songs about maths
- focus activities that teach children basic maths and calculation skills.

Planning

Planning is undertaken at three levels:

Long term planning is based on the yearly teaching programmes set out in the Framework.
M**edium term** we follow the WhiteRose scheme.
Short term planning is carried out weekly. These plans include learning objectives/intentions, starters to review key learning, success criteria, main teaching activity, independent and guided activities, any differentiation, plenary, key vocabulary, questions and resources.

Cross-curricular links

Mathematics is taught mainly as a separate subject but every effort is made to link maths with other areas of the curriculum. We try to identify the mathematical possibilities across the curriculum at the planning stage. We also draw children's attention to the links between maths and other curricular work so children see that maths is not an isolated subject. In the Early Years, these links are more evident because of the less formal timetable.

Teaching principles and approaches

- Teachers believe in the importance of mathematics and that the vast majority of children can succeed in learning mathematics in line with national expectations.
- The whole class is taught mathematics together, with no differentiation by acceleration to new content. ***We do not group children by ability***. The learning needs of individuals are addressed through careful scaffolding, questioning and appropriate rapid intervention where necessary, to provide the appropriate support and challenge.

- The reasoning behind mathematical processes is emphasized. Teacher/pupil interaction explores ***how*** answers were obtained as well as ***why*** the method worked and what might be the most efficient strategy.
- Precise mathematical language, often couched in full sentences, is used by teachers so that mathematical ideas are conveyed with clarity and precision. We value 'mathematical talk' and children get lots of opportunity to talk about and evaluate their mathematics during lessons.
- ***Conceptual variation*** and ***procedural variation*** are used extensively throughout teaching. This helps to present the mathematics in ways that promote deep, sustainable learning.
    a. Conceptual variation is where the concept is varied and there is intelligent practice. Positive variation is showing what the concept is, and negative variation is showing what the concept isn't. This clears away misconceptions at the very start. Within positive variation, both standard and non-standard representations are shown.
    b. Procedural variation is where different procedures and/or representations are used to bring about understanding. For example, teachers may collect several solutions for a problem (some right, some wrong) before guiding the class towards the most efficient method. It also involves highlighting the essential features of a concept or idea through varying the non-essential features. Variation is not the same as variety – careful attention needs to be paid to what aspects are being varied (and what is not being varied) and for what purpose.
- Sufficient time is spent on key concepts to ensure learning is well developed and deeply embedded before moving on.

Lesson Design

- Lessons are sharply focused with one new objective introduced at a time.
- Difficult points and potential misconceptions are identified in advance and strategies to address them planned. Key questions are planned, to challenge thinking and develop learning for all pupils.
- The use of high quality resources and tasks to support learning and provide access to the mathematics is integrated into lessons.
- There is regular interchange between concrete/contextual ideas and their abstract/symbolic representation.
- Making comparisons is an important form of developing deep knowledge. The questions "What's the same, what's different?" are often used to draw attention to essential features of concepts.
- Appropriate vocabulary is planned into each lesson and children are expected to use it in their verbal and written explanations.

Lessons

In Key Stage One lessons last for approximately 45 minutes minimum. The children are taught in mixed ability classes. When children start in Reception the organisation is more flexible building up to a 30-minute adult directed session in the Summer Term. In Key Stage Two Mathematics lessons can be approximately 1 hour. The children are taught in mixed ability classes.

Assessment and Record Keeping

At Sacred Heart we are continually assessing our pupils and recording their progress. We see assessment as an integral part of the teaching process and endeavor to make our assessment purposeful, allowing us to match the correct level of work to the needs of the pupils, thus benefiting the pupils and ensuring progress. Assessment is carried out on three levels.

Short-term assessments are an informal part of every lesson and are closely matched to the teaching objectives. These are for the teacher's and pupil's immediate attention and action.
Medium term assessments are carried out every term using NFER assessment papers. The purpose of these assessments is to review and record the progress the pupils have made in relation to the key objectives.

Long term assessments are carried out towards the end of the school year when pupils' attainment is measured against school and national targets. This is done by drawing on teacher knowledge and Summer Term NFER papers and any supplementary notes that have been made and where applicable QCA tests.

Reporting

All parents receive written reports on a termly basis on which there is a summary of their child's effort and attainment in mathematics over the term. At the end of Key Stage 1 and Key Stage 2 each pupil's level of achievement against national standards is included as part of their annual written report and their current attainment levels are shared at termly Parent's Evenings.

Display

We recognise the important role display has in the teaching and learning of mathematics by having maths work displayed in the school. Every class has a mathematics board, where possible in the main teaching area, which has interactive resources (relevant to the work the children are doing), number grids, vocabulary and other display materials that provide a visual support for the children's mental processes. Teachers are also encouraged to display good quality maths work relating to the current learning or module.

Resources

Resources for the delivery of the maths curriculum are stored both centrally and in classrooms. Everyday basic equipment is kept in classrooms. Additional equipment, outdoor boxes and topic-specific items are stored centrally.

Each class, including SEN and EAL, have basic number resources stored in the classroom, to be used to support the teaching and learning of maths. These are also a main resource for the delivery of interventions.

Sacred Heart School uses a variety of methods, strategies, resources, ICT and visual aids to support the teaching and learning of mathematics. Materials are frequently updated, as new and relevant items become available. The maths subject leader orders new resources after completing audits and having consultation with the staff.

Equal Opportunites

As a staff we endeavor to maintain an awareness of, and to provide for equal opportunities for all our pupils in mathematics. We aim to take into account cultural background, gender and Special Needs, both in our teaching attitudes and in the published materials we use with our pupils.

Children with Special Educational Needs

Wherever possible we aim to fully include SEN pupils in the daily mathematics lesson so that they benefit from the emphasis on oral and mental work and by listening and participating with other children in demonstrating and explaining their methods. Where necessary, teachers will, in consultation with the inclusion manager, draw up individual targets for the SEN pupils. If a child's

needs are particularly severe, they will work on an individualised programme written in consultation with the appropriate staff. When planning, teachers will try to address the child's needs through simplified or modified tasks, visual and practical resources or the use of support staff.

Homework

One piece of mathematics homework will be provided each week (differentiated where appropriate) which should consolidate the skills/ knowledge taught that week or the previous week. The amount of homework set is about XX minutes in KS 1 and about 30 minutes in KS 2. Not all homework is written work, which needs marking. We encourage teachers to set work, which makes use of the home context. It is expected that Times Tables are an ongoing homework task. We also set work using online resources such as Mathletics and MyMaths.

The Subject Leader

The Maths Subject Leader's role involves:

- modelling good practice and updating the school policy when necessary
- being responsible for the upgrading and ordering of resources and arranging for their storage
- keeping informed about developments and new initiatives to support the teaching of Maths and ensure staff are informed
- auditing needs and organising staff training
- analysis of Mathematic levels throughout the school and ensuring targets are met.
- monitoring planning on a termly basis with the head teacher; scrutiny of books and lesson observations with constructive feedback; monitoring learning environments
- supporting teachers in planning and using resources;

Part 2: Calculations

Introduction

This part of the mathematics policy has been written with the National Curriculum at the heart of it. This section of the mathematics policy outlines the progression in teaching for each operation and gives examples of concrete, pictorial and abstract representations. This section includes sections on: addition, subtraction, multiplication and division.

See Calculation Policy – separate number operation documents,

The National Curriculum Aims

The national curriculum for mathematics aims to ensure that all pupils:

- Become fluent in the fundamentals of mathematics, including through varied and frequent practise 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.

Each of the four operations build on a solid understanding of place value, the connections between the four number operations and number sense, such as: whether they are odd or even, whether they are close to multiples of ten or if they are close together.

- Children need to use correct mathematical terminology (referred to as 'key language') in context and be able to verbalise their calculation strategies.
- Children need to make considered decisions as to the most appropriate methods to make mathematics more functional. They need to choose the most appropriate, fluent, efficient and accurate method to do a particular calculation.
- Children need to use concrete resources before they progress to pictorial and abstract representations. This CPA (concrete, pictorial and abstract) approach needs to be available to children throughout school, as and when necessary. Use of manipulatives (numicon, Cuisenaire, dienes, HTO counters etc.) helps reinforce understanding and provides support when calculating mentally, mentally with jottings, using expanded methods and formal written methods. Use of the bar model, number lines and part-part whole diagrams are recommended.
- Children should progress between the stages working towards formal written methods (where appropriate), once they have mastered each stage. However, they should not be hurried and, after the method has been taught, children should still be able to make their preferred choice of the most appropriate, efficient and accurate method for them. Previous stages may need to be revisited to consolidate understanding when introducing a new strategy.
- As new methods of calculations are introduced, children should have the opportunity to examine them, alongside the method they have consolidated, to make connections between the methods and establish the similarities and differences between them.