

Mathematics Policy

Rationale

As a Catholic School our study of Mathematics must be undertaken within an acceptance of Christian moral guidelines and beliefs.

These underlying principles include:

- Belief in God's creative power.
- Belief in the dignity of human beings.
- Respect for other living things.
- Respect for points of view held by others.

The study of Mathematics, as in the study of all subject areas, cannot be 'value-free'. It is the role of our Catholic School to ensure that Christian principles and values are passed onto our children.

Discussing God's part in Mathematics should be considered a 'normal' part of a maths experience.

The National Curriculum recognises the importance of the following:

- Spiritual development – helping pupils obtain an insight into the infinite. Discussing the underlying mathematical principles behind natural forms and patterns.
- Moral development – helping pupils recognise how logical reasoning can be used to consider the consequences of actions.
- Social development – helping pupils to work together creatively to that which produce something better than by one person/pupil.
- Cultural development – how mathematicians from many cultures have contributed to modern day mathematics.

Why Teach Mathematics?

"Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject."

(The New National Curriculum in England framework document, July 2014)

Mathematics is a way of communicating, being used to describe, to illustrate, to interpret, to predict and to explain. It is a creative subject in which pupils have

the chance to explore for themselves, as well as to create beautiful and elegant objects, patterns and arguments.

Aims

At SS Alban and Stephen school we recognize that all pupils know a lot of mathematics whatever their stage of schooling. We aim to ensure teaching is consistent; making all lessons at least good with many outstanding, so that every pupil receives a good mathematics education. We aim to:

- Help every child to become strong and confident mathematicians through: encouraging strong conceptual understanding of maths; its structures and its relationships; their ability to recall and apply knowledge confidently and their security in written methods.
- Enable every child to enjoy their maths.
- Help children have confidence to tackle any problem that they might come across in their daily life. The expectation is that all children welcome challenge and that we, as teachers, develop the understanding that we all, even the most able, may struggle.
- We aim to place problem solving and investigative skills at the heart of mathematics teaching. We recognise that collaborations and communication are crucial life skills and should be developed through mathematics. Giving children a chance to achieve at the highest level that they are capable of and challenge them with rich problem solving tasks.
- Give children a firm basis of knowledge and skills so that they are numerate and able to work flexibly and think clearly.
- Through assessment, planning and preparation we ensure that all children progress when they are ready, securing knowledge and skills before introducing new concepts.
- Give every child access to stimulating and appropriate maths activities, chosen from a broad and balanced curriculum, that help children to think and to enjoy what they are doing.

Content

The programmes of study defined in the National Curriculum set out what pupils should be taught and the attainment targets outline the expected standards of pupil performance.

In Key Stage 2 the programmes of study are:

- Number – Number and place value, addition and subtraction, multiplication and division, and fractions including decimals and percentages
- Measurement
- Geometry – properties of shape, position and direction
- Statistics
- Algebra

Method

The school works to the expectations set out in the framework document for the national curriculum in England, July 2014. At SS Alban and Stephen we ensure that our curriculum for mathematics is tailored to meet the individual needs of each cohort and to fulfil our ambition for the children by the time they leave us. This involves:

- Reviewing and adjusting planning and teaching using the framework to guide us.
- Setting is used in upper key stage two and classes are split three ways to ensure work is tailored to each child. Booster groups are used throughout the school where necessary to reinforce and develop learning for target children.
- A high proportion of lessons focusing on numeracy skills.
- Greater emphasis on whole-class teaching, promoting participation.
- Controlled, manageable differentiation.
- Emphasis on rich, applied mathematical tasks.
- Giving mathematics a context so it has a purpose for learning.

There is an emphasis on mental calculation, with interactive oral and mental work in each lesson (eg. THUNK, 6x6-grid, Visual problem pictures and discreet weekly mental maths lesson). During registration, children are also set quick mental maths activities (SODA).

A typical daily mathematics lesson displays these features:

- An oral and mental starter to rehearse and sharpen skills.
- A main teaching activity followed by practical and/or written work for the pupils.
- A plenary in which feedback is taken, ideas summarized and/or homework set.

The Teaching

Effective teaching involves:

- High expectations and clear objectives which are conveyed to the children.
- Well-structured lessons, a suitable pace including purposeful plenaries.
- Effective differentiation (differentiation by activity, outcome, support and grouping) and questioning in whole-class work to involve all children and make informal assessments of their progress.
- A high proportion of direct teaching, with resources used well to model methods.
- Manipulatives used to support and reinforce conceptual development, including Numicon, Base Ten, counting sticks, Cuisenaire Rods, number lines, one hundred squares and many other practical pieces of equipment.

- Mathematical games (both electronic and 'hands on') to motivate and engage children. These can be used by the teacher to develop concepts or independent practice by children.
- Use of correct mathematical vocabulary and notation.
- Varied opportunities for children to demonstrate and explain, do practical work, practice and solve problems.
- Discussion and effective questioning by pupils so they can build secure foundations by probing and remedying their misconceptions.
- Support staff deployed effectively.
- Maths presented in context using the school environment and the wider world, the curriculum ensures children explore, make connections, seek patterns, recognise relationships and are creative with mathematics.

The Planning

A common format is used for planning a balanced programme of objectives for each term. All Year groups use curriculum objectives to support and inform their planning. Weekly plans include the following:

- Due emphasis is given to mental and oral work.
- There is a structured approach to teaching mental calculation.
- Written methods are built on secure mental strategies.
- Standards are in line with expectations in the New Framework and the National Curriculum descriptors.
- Each unit of work is re-visited at appropriate intervals.
- Great emphasis is given to the application of mathematics through problem solving throughout the five strands.
- A variety of ways of working throughout the week – whole class, group and individual.
- The children are learning through a variety of activities – listening, discussing, practical work, practising, investigating.

The role of teaching assistants

Teaching Assistants are actively involved in teaching small groups within lessons and in providing intervention sessions. They support groups in the classroom, enabling the teacher to work with all groups on a weekly basis. They offer sensitive support and are expected to modify tasks, materials and teaching resources as required.

They demonstrate initiative in using practical resources to support learning and help pupils overcome difficulties, for example, by using strings of counting beads to aid early multiplication. They are careful not to over-direct pupils' learning.

They spot misconceptions and gaps in learning, and take responsibility for assessing pupils in their groups, and help to identify the next steps and plan subsequent activities with the class teachers. They participate in reviewing pupils' progress and are particularly effective in identifying and supporting personal problems that present barriers to learning.

Evaluation and Assessment

All assessment is used to inform teaching and learning. We identify children's understanding and then swiftly focus interventions to overcome misconceptions.

At Ss Alban and Stephen we assess children in four main ways:

- Assessment for learning: continuous
- Marking: daily/weekly
- Half termly: Pupil progress reviews to assess interventions and support
- Termly Assessing Pupil Progress (Phases and Steps criteria)
- End of Key Stage transitional Assessments: annually

Daily marking should:

- Indicate success and need for improvement relating to the learning objective for the lesson
- Measure attainment against that person's previous achievement, when marking against the learning objective,
- Be consistent throughout the school
- Ultimately, be seen by children as positive in improving their learning
- Be manageable and practical for teachers

(For more details see Marking Policy).

Examples of prompts for maths.

Reminder prompt:

Most suitable for children who have understood their objectives well – it simply reminds the children of what could be improved.

*E.g. reminding a child to adjust
"add 20 – 1" to calculate "add 19"*

Scaffolded prompt:

Most suitable for children who need more structure than a simple reminder. This provides some support; it could be a question, a directive or perhaps an unfinished question.

E.g. a comment like you've added 20 but you needed to add 19. What do you need to do now?

Example prompt:

Extremely successful with all children, but especially with average or below average children. This prompt gives children options to choose from.

*E.g. a worked example on the number line showing a jump forward of 20 and a jump back of 1 to model leaving 19
"20 – 1" to calculate "add 19"*

Towards the end of the school year we assess and review pupils' overall progress and attainment by drawing upon "Phases and Steps", their class record of attainment against key objectives and supplementary notes and knowledge about children to produce a summative record. Accurate information is then reported to parents and the child's next teacher.

Record keeping:

Attainment is recorded as follows:

- Each child will have a highlighted "Phases and Steps" and working mathematically criteria record sheet (which are saved in the individual teacher's assessment folder).
- Termly overview "Moving on" grids are completed and inputted into SIM's

Staff hand on records, mark books and planning summary to the next teacher and discuss children's individual needs and achievements.

Resources

For the teaching of number the following are used:

- Number lines and squares, including empty number lines to aid mental calculation.
- Number cards: digit cards, place value cards, loop cards, symbol/operation cards.
- Objects – assorted dice etc.
- Posters, 100 square grids, multiplication charts.
- Games and puzzles.
- Numicon, Base Ten, counting sticks, Cuisenaire Rods etc.
- Laptops, iPads, websites and Interactive Whiteboard

All classrooms have access to a supply of practical mathematical equipment and a Maths Working Wall which is updated regularly in accordance with unit coverage.

The Abacus, Heinemann and Ginn schemes of work provide some useful activities and there is a comprehensive bank of photocopiable materials, lists of websites for maths games and activities and also all children have a log-on for my-maths.

Information and communication technology (ICT)

Calculators should not be used as a substitute for good written and mental arithmetic. They should, therefore, only be introduced near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure. Teachers should use their judgement about when ICT tools should be used to support and extend learning.

Health and Safety

We adhere to the national and local health and safety regulations and requirements. Children need to be taught the appropriate way to handle mathematical equipment e.g. compasses, rulers, thermometers etc.

Homework

We believe that the purposes of homework are to:

- Involve parents in their child's learning.
- Help parents keep abreast of what their child can and cannot do.
- Take advantage of the home context and apply some mathematics in a non-school situation.
- Encourage children to talk about their number work and explain to their parents what they are doing and how.
- Extend the time for learning mathematics and give some extra practice in number work.

Homework is therefore regularly set throughout the school.

Ensuring a Whole School Approach – Monitoring

Lessons are observed to ensure the key features of the National Curriculum are being implemented. Moderation of childrens' work also takes place to ensure progression across the school is being achieved and to ensure activities match the planning.

Inclusion

All mathematics we work on shows positive images of the various groups in society. Above all we celebrate and affirm the diversity in our school, our community, our society, and our world and commit ourselves to enabling all our pupils to participate constructively as they grow.

For every child to be able to participate we must know each of them as individuals. For children with SEND, teaching must be closely linked to their IPM targets. What is good provision for a child with SEN is good for all children i.e. an abundance of activities that allow children to learn visually, through speaking and listening and kinesthetically.

Specific needs are diagnosed and support provided in a variety of ways:

- IPM's which include a mathematical focus.
- Additional differentiation and/ or extra support to enable pre-learning, vocabulary learning and consolidation, e.g. for children with English as an additional language.
- An emphasis on practical work involving the use of appropriate materials.
- For the more gifted children differentiated group work, extra challenges and opportunities for independent learning to broaden and deepen knowledge and understanding.

The Responsibilities of the Mathematics Co-Ordinator

Our Maths Subject Leader must always be an outstanding practitioner in their own right in order to lead by example. To tackle barriers and ensure consistency, they are responsible for:

- Monitoring teaching and learning through lesson observations, work scrutinies and pupil progress reviews.
- Using the information gathered from data analysis to improve teaching and the curriculum.
- Robustly challenging weak teaching and identifying what support or development is needed.
- Assisting with individual and group target setting and ensure progress against these targets is effectively shared with parents
- Preparing and organising INSET as necessary

The Maths Subject Leader must also work in partnership with other members of the leadership team and Governors in raising standards in Mathematics across our school and maintaining the high profile of mathematics in the School Improvement Plan.

Review and Evaluation of the School Policy

With the Headteacher's guidance, this policy is reviewed annually.

April 2015

Signature of Chair of Governors