

St. Giles Junior School - Maths Policy and Guidelines

What is mathematics?

'Mathematics equips pupils with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills, and the ability to think in abstract ways. Mathematics is important in everyday life, many forms of employment, science and technology, medicine, the economy, the environment and development, and in public decision-making.

Different cultures have contributed to the development and application of mathematics. Today, the subject transcends cultural boundaries and its importance is universally recognised. Mathematics is a creative discipline. It can stimulate moments of pleasure and wonder when a pupil solves a problem for the first time, discovers a more elegant solution to that problem, or suddenly sees hidden connections.' N.C. Orders

1. Introduction

The N.C. Mathematics programmes of study and the National Numeracy Strategy Framework for teaching mathematics are fully aligned.

The N.C. Order describes what must be taught in each key stage and the Framework provides guidance to deliver the orders.

Since September, 1998, St. Giles has used both to plan the mathematics taught in the school.

The Framework contains a set of yearly teaching programmes showing how and what Maths can be planned and taught from Year 3 to Year 6. These objectives cover all aspects of the N.C. for mathematics in Key Stage 2. It is intended to help children become more confident and competent with numbers and the number system, to solve problems, to know and use measures and to understand how information is gathered and presented in graphs, diagrams, charts and tables.

2. Teaching Mathematics

The approach to teaching recommended by the N.N.S., and adopted by St. Giles, is based on four key principles:

- Daily mathematics lessons - each maths lesson should last for 50 to 60 minutes in Key Stage 2.

- Direct teaching and interactive oral work with the whole class and groups. It is important that as much time as possible is spent in direct teaching and questioning of the whole class, group or individual. Direct teaching needs to be oral, interactive and lively with the pupils playing an active part, not only answering questions but also contributing to discussions, explaining methods and strategies used. (More details of good direct teaching methods are included in the Framework p11-12)
- An emphasis on mental calculation.
- Differentiation, with all pupils engaged in mathematics relating to a common theme.

3. Programme of Study

There are 3 maths attainment targets - number; shape, space and measures; and handling data. It is important that connections are made within and across these sections.

The Framework has 5 strands. The first 3 are linked to N.C. programme of study for number, the fourth strand is linked to measures, shape and space, while the fifth is linked to handling data. Using and applying mathematics is integrated throughout and is the first section described in each target.

Ma 2 Number

Number and the Number System

During key stage 2 should use the number system more confidently. The number topics are:

- Using and applying number
- Counting
- Properties of numbers and number sequences, including negative numbers
- Place value and ordering, including reading and writing numbers
- Estimating and rounding
- Fractions, decimals and percentages, and their equivalence; ratio and proportion

Calculations

- Understanding number operations and relationships
- Rapid mental recall of number facts
- Mental calculation, including strategies for deriving new facts from known facts
- Pencil and paper methods
- Using a calculator
- Checking that results of calculations are reasonable

Solving Problems

- Making decisions: deciding which operation and method of calculation to use (mental, mental with jottings, pencil and paper, calculator)
- Reasoning about numbers or shapes
- Solving problems in real life context, money, measures

Ma 3 Shape, space and measures

- Using and applying shape, space and measures
- Understanding properties of shapes
- Understanding properties of position and movement
- Understanding measures, including choosing units and reading scales

Ma 4 Handling Data

- Using and applying handling data
- Processing, representing and interpreting data

4. Approach to Calculation

There are several ways of carrying out calculations: using paper and pencil methods, using a calculator, working things out mentally or a combination of these.

Children will need to be taught all methods so that they can choose the most efficient and appropriate. Often a mental approach to calculations is the most efficient method and needs to be taught explicitly and regularly. An emphasis on mental calculation does not mean that written methods are not taught. There needs to be a balance between mental and written methods, and the way the children progress from one to the other, is very important. The development of formal methods of recording and performing calculations should follow from a firm grounding in learning, understanding and using a range of mental calculation strategies.

Detailed guidance on the progression from mental to written can be found both in the Framework, QCA and N.C. documents.

The first part of each lesson at St. Giles is devoted to developing mental strategies, learning facts by heart and applying known facts to work out related facts. The children in the upper school are also tested on a weekly basis to practise quick recall and quick appliance of strategies.

Children need to learn how to use **calculators**, including calculator functions such as the memory key and the constant function. However they should not be used as a prop for calculations, which can and should be done mentally or with pencil and paper. Consequently calculators should not be used as a calculating tool until Year 5 and 6.

5. A Typical Lesson

A typical lesson in St. Giles is structured in the following way:

- Oral work and mental calculation (10 minutes)
Whole class work to rehearse, sharpen and develop mental and oral skills.
- The main teaching activity (about 30 - 40 minutes)
Teaching input and pupil activities - children work as a whole class, in groups or as individuals.
- The plenary to round off the lesson (10 minutes)
A time to identify progress, sort out errors, to revise key facts, to discuss next steps and to set homework.

(More details of each part is included in the Framework p13 - 15)

6. Homework

Homework is set weekly in Maths in each year group to extend and consolidate the work being done in the class that week. The amount of work is increased in the upper school.

Children might be asked to complete an activity, to learn some number facts, to play a game, to work on a number puzzle or to complete a short written exercise. Whatever the homework, it is important that the work is marked and that children get immediate feedback. Common errors or solutions to puzzles can be discussed in the plenary. (See St. Giles Homework Policy)

7. Cross Curricular Links

It is important to look for opportunities for maths in other curricular areas through practical activities. Activities such as recording the growth of a plant in Science, measuring temperature and rainfall in Geography, or investigating the cog wheels in a bicycle (Design/Technology), can provide data or starting points for discussions as well as opportunities to apply and use maths in real contexts. It is important to draw children's attention to the links between subjects by talking about them.

8. Planning

In each year group teachers use long, medium and short planning sheets to help plan and prepare the maths that is to be taught. The long and medium term planning sheets are from the Framework. The weekly planning sheet used in St. Giles is one recommended by the Warwickshire Maths Team.

The Framework consists of a set of yearly teaching programmes summarising

teaching objectives for each year. Each double page programme covers the full range of the N.C. for mathematics that is relevant to the year group (**long term planning sheets**).

With each year's programme are two planning grids to help plan a term's work (**the medium term planning sheets**). Each grid indicates the topics to be taught in units of work, when they are to be taught and the recommended number of days of lessons for each unit. The first and last units in each term are always shorter to allow for the start and end of term. Two days are set aside in each half term to assess and review progress. These units may be taught in any order.

The weekly planning sheet includes the objectives for 1 week's work, for both the mental and main teaching activity. The short term plans focus on how to teach the units. Detailed lesson notes are included with differentiated activities, resources, key vocabulary and homework listed. Assessment is also included to show either those who over or under achieve or as a whole class record.

Before planning medium term plans it is necessary to consider what the children have been taught before and what they can understand and do.

This will be based on the teacher's short-term assessment after teaching a unit of work. Each medium term planning sheet should be highlighted in one colour if 80% of the children have met the objectives in full and another colour if the objectives were only introduced. At the end of the year teachers will highlight what 80% of the children can do on the long term sheet, the yearly objective sheet, to pass on to the next teacher.

These planning sheets will form the school's scheme of work.

A variety of schemes, mainly the Folens mathematics scheme, 100 Maths Lessons, Maths Chest and Cambridge (Year 6) are used alongside the Framework to support and deliver the maths work to be covered.

9. Differentiation

The children should work together and participate when a new unit of work is introduced. Most of the needs of children can be met through differentiated group work and open-ended tasks. All children benefit from questioning and it is important that all children take part in the oral work. During questioning, use open questions that allow all children to respond or target SEN or more able children by asking them appropriate and specific questions. SEN children can be

supported by classroom helpers. They can ensure that all children respond and take part. They need to position themselves close to those children who need special help.

Children in Year 5 and 6 are currently set into 3 groups - 2 groups with 1 extension group in each year group. These groupings are flexible and allow easy transfer. More able pupils can be stretched through harder activities, differentiated homework and extra challenges.

10. Assessment

Assessment and recording need to be useful and manageable.

Short-term assessments:

This type of assessment is an informal part of every lesson. It is to:

- Check that the children understand concepts taught in that lesson;
- It is to check that children are remembering number facts and using mental calculation strategies;
- It gives immediate information to adjust day to day lesson plans.

Short-term assessments should be recorded on the weekly plan as they are for immediate attention, informing subsequent planning.

Medium-term assessments:

Medium-term assessments are to:

- Review and record progress children are making in relation to key objectives (objectives written in bold in the Framework), what they can do, can they apply their skills and do they have any weaknesses.
- Identify children's progress against specific individual targets (including IEP's);
- To help plan work over the next half term;
- To provide information to complete end-of-year assessments.

It is not necessary to record each child's progress against every teaching objective. The medium-term assessment can be recorded on the medium-term plans - highlight 80% can do or not.

Long-term assessments:

These are important too. They are to:

- Assess children's work against the key objectives for the year;
- At the end of the key stage, assess pupil's work against national standards;
- To report on individual progress to parents and the next teacher;
- To set targets for the N.C. tests in future.

The long-term assessments are made through end-of-year tests. All children (with the exception of Year 6) sit the non-statutory QCA tests. The marks

standardised score and level are recorded onto class lists. These help to monitor progress, identify strengths and weaknesses and compare with previous year's scores.

For Year 6 as well as the N.C. mathematics tests, teacher assessment needs to be done to sum up individual attainment against the N.C. level descriptions.

Test analysis should look for particular strengths and weaknesses, for example in terms of gender and ethnicity and maths topics.

(See St. Giles School Assessment Policy.)

11. Marking

Marking should be done as soon as possible. It is important to give children feedback on their written work so that they know what they have achieved and know how to improve. This can be done orally to the class, group or individual or through constructive, written comments.

(See St. Giles School Marking Policy.)

12. Resources

A number of QCA publications to accompany the Framework:

- Teaching written calculations: Guidance for teachers at key stages 1 and 2
- Teaching mental calculation strategies: Guidance for teachers at key stages 1 and 2.
- Mathematical Vocabulary
- Standards in Mathematics : Exemplification of Key Learning Objectives from Reception to Year 6.
- Training materials/booklets.

Folens Maths Scheme

100 Maths Lessons - Scholastic

WCC Guidelines

Maths Chest 3 - 6

Cambridge Maths Year 6

Additional books for different topics are stored in the Year 6 corridor, while Maths interest books are in the school library.

Class Resources:

- 100 square, multiplication square;
- range of number lines (depending on year group)
- washing line with variety of cards, etc.
- digit cards, digit fans and arrow cards
- white boards and pens
- Place value material and cards

- Range of small counting apparatus, counters, blocks, dice
- Mathematical Dictionaries

Centrally stored resources:

- A range of additional resources are stored in Year 6 corridor, labelled and stored in trays or boxes.
- 2 complete class sets of calculators and protractors are stored in Year 6 classroom as well as 1 class set of calculators in the Year 6 corridor.

Sarah Evans
January, 2001.

An Amendment to the Maths Policy

13. ICT

ICT includes the calculator and extends to the whole range of audio-visual aids, including audio tapes, video film and educational broadcasts. ICT can be used in various ways to support Maths teaching and motivate children's learning. It can be used effectively by the teacher with the whole class, a group or one or two children with a classroom assistant. ICT resources should be organised effectively to meet the mathematics learning objectives. *ICT should be used if the teacher and /or the children can achieve something more effectively with it than without it.*

ICT resources can help teaching and learning mathematics by:

- Exploring, describing and explaining number patterns;
- Practising and consolidating number skills;
- Exploring patterns in data;
- Estimating and comparing measures of distance, angle, time, and so on;
- Experimenting with properties of shapes and geometric patterns;
- Developing mathematical vocabulary, logical thinking and problem solving skills.

For further information read - Appendix 1 The National Numeracy Strategy Framework - references to ICT.