



# **MATHEMATICS POLICY**

**Mathematics Co-ordinator**

**Mrs S Walmsley**

- Updated By Mrs Sara Walmsley- Summer 2014
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# CONTENTS

Policy Statement	3
Aims	3
The National Curriculum & Primary National Strategy	3
The Role of the Co-ordinator	3
Planning	4
Cross Curricular Links	4
Teaching Methods & Approaches	4
Organisation	4
Differentiation	5
Homework	5
Display	5
Assessment & Record Keeping	5
Reporting to Parents	5
Resources	6
Equal Opportunities	6
Children with Special Educational Needs	6
High Achievers	6
Glossary	7
Appendix	8-10

## APPENDIX

1. Weekly planner – short term planning;
2. Medium Term unit plan (or cover sheet);
3. Example of Year overview (Long term planner);

Also see ‘Calculation Policy’ for further information regarding methods taught in Mathematics for the for rules of number.

## POLICY STATEMENT

### Why Teach 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 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.

(National Curriculum for Mathematics 2014)

### Aims

- To raise the standards of achievement of the pupils;
- To secure good leadership in Mathematics and to set high expectations of what can be achieved by staff;
- To set expectations for developing number fluency, reasoning and problem solving skills for all pupils;
- To provide a broad and balanced mathematical curriculum, with a range of mathematical contexts for pupils to explore;
- To increase pupil confidence in mathematics so they are able to express themselves and their ideas using the language of maths with assurance and sound reasoning;
- To develop efficient and effective systems for recording and reporting pupils' progress and attainment in mathematics in order that they can mature and become more competent with number and measures.

### The National Curriculum and the Primary Framework for Numeracy

The National Curriculum Order for Mathematics describes what must be taught in each Key Stage. Springdale follows the National Curriculum for Mathematics, which provides detailed guidance for the implementation of the orders and ensures continuity and progression in the teaching of mathematics.

We ensure coverage of the National Curriculum for Mathematics at Key Stage 2. All teachers and support staff have copies of the curriculum and linked planning.

### The Role of the Co-ordinator

- To have an overview of practice that is taking place in the school.
- To support staff through Inset, planning and delivery of mathematics.
- To attend relevant training and meetings.
- To monitor and manage the use of resources and be responsible for the expenditure of the maths budget.
- To monitor planning and practice.
- To audit and action plan areas of need.
- To liaise with link Secondary and Infants school staff and schools within our Learning Community Network.

### Planning

Planning is undertaken at three levels.

**Long Term** planning is based on the objectives set out in the National Curriculum for Mathematics 2013. (Appendix 1 p8)

**Medium Term** planning is carried out for each area of Mathematics taught. Teachers select the objectives to be taught for these units from the unit planning sheets provided, referring to the higher or lower years where necessary. We recognise the need to revisit topics regularly to revise and consolidate skills and then extend them. The medium term plans have been provided by the Numeracy co-ordinator based on the new curriculum and form a developmental scheme of work. (Appendix 2 p9)

**Short Term** planning is carried out weekly. These plans include learning objectives for the mental/oral starter and the main activity, resources to be used (including ICT), any differentiation, key vocabulary, key questions, homework and evaluation comments. (See Appendix 3 p10)

The short term planning is monitored termly by the Senior Management Team and half-termly by the Mathematics co-ordinator.

### 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 and identify the mathematical possibilities across the curriculum at the planning stage. (Links in the Curriculum 2013) We also draw children's attention to the links between mathematics and other curricular work so they see that maths is not an isolated subject.

## Teaching Methods and Approaches

Lessons follow a standard format including a mental/oral starter, a main activity and a plenary session.

Maths teaching at Springdale provides opportunities for:

- Group work
- Paired work
- Whole class teaching
- Individual teaching

Pupils engage in:

- The development of mental strategies and skills
- Written methods
- Practical work
- Investigational work
- Problem solving
- Mathematical discussion
- Consolidation of basic skills and routines

At Springdale we recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. We also recognise the importance of using the appropriate vocabulary in our teaching and children are expected to use it in their verbal and written explanations. We endeavour to set work that is challenging, motivating and encourages the children to talk about what they have been doing. Numicon is used to support understanding in number and a visual calculation policy is also in place in order to ensure consistency in approaches throughout the school.

## Lesson Organisation

The daily mathematics lesson lasts for approximately one hour. Children are set according to the ability for all maths lessons. There are two or three main sets across each year group and an additional set consisting mainly of Language Resource Base children, where appropriate. All support staff are given clear roles to play during lessons. These groupings are flexible and children are moved between sets as appropriate after teacher consultation.

## Differentiation

This should always be incorporated into all mathematics lessons and can be done in various ways:

- ❖ Stepped Activities: which become more difficult and demanding but cater for the less able in the early sections.
- ❖ Common Tasks: which are open ended activities/investigations where differentiation is by outcome.
- ❖ Resourcing: which provides a variety of resources depending on abilities eg. counters, cubes, 100 squares, number lines, mirrors.
- ❖ Grouping: according to ability so that the groups can be given different tasks when appropriate. Activities are based on the same theme and usually at no more than three levels.
- ❖ Support: Children are given support from the class teacher or Teaching Assistant in order to complete a task.

## Homework

Mathematics homework is given each week. The amount set is usually between 30 minutes to an hour, depending on the year group. Not all homework is written work which needs marking. Children are also encouraged to practise number bonds and multiplication facts at home and use web-based skills practice sites such as Numbergym, Education City and SumDog.

## Display

At Springdale we recognise the role display has in the teaching and learning of mathematics by having maths work displayed in the school. Every classroom has a mathematics board or area, which has number lines, number grids, vocabulary and other display material that provides a visual support for the children's mental processes. Staff are also required to display vocabulary posters linked to the visual calculation policy in their classroom to ensure pupils become familiar with the progression of methods.

### Assessment and Record Keeping

At Springdale we are continually assessing our pupils. We see assessment as an integral part of the teaching process and endeavour 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 immediate attention and action and tend only to be recorded as marking comments in books or recorded on short term planning sheets.

**Medium term** assessments are carried out half termly. The purpose of these assessments is to review and record the progress the pupils have made in relation to the units taught. These assessments are recorded in SIMs as a teacher assessment.

**Long term** assessments are carried out towards the end of the school year (in May) when pupils' attainment is measured against school and national targets. Statutory tests are carried out at year 6 and non-statutory in year 5. Evidence is collected by the Mathematics co-ordinator through a full analysis of all the questions for each paper. This evidence is passed onto the next class teacher to be used for future planning and to highlight any areas of concern.

### Reporting to Parents

All parents receive an annual written report on which there is a summary of their child's effort and progress in mathematics over the year. Parent's evenings are held during the Autumn and Spring term where targets are set and progress and concerns are discussed. At the end of year 6 each pupil's level of achievement against national standards is included as part of the annual written report. Parents are given the opportunity to find out about how we teach Mathematics at Springdale and ask any questions they have regarding the teaching of Mathematics at Springdale during year group open afternoons in the Summer Term or through parent consultation meetings.

### Resources

Resources for the delivery of the mathematics curriculum are stored both centrally and in classrooms. Everyday basic equipment is kept in classrooms. (including calculators) Additional equipment and topic specific items are stored centrally. Books are stored on shelving in the two teaching corridors, appropriate to upper and lower Key Stage 2.

A number of published materials are used to facilitate the teaching of mathematics but as a school we realise the need for the teaching of maths to be scheme assisted not scheme driven. The main published schemes being used at present to support the delivery of the framework are Collins, Abacus, Numicon, and Target Maths. A variety of other resources are available. Mathematics materials are updated, when relevant, through consultation between the co-ordinator and staff.

Numicon is used throughout the school and staff are encouraged to ensure pupils have access to the resources, should they require it, at all times. The strategy aims to develop number fluency by using a visual, practical base to develop conceptual understanding and fluent recall, help children to reason mathematically through the use of concrete objects and spoken language to explain and justify and develop children into confident problem-solvers.

### Equal Opportunities

As a staff we endeavour 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 children.

### Children with Special Educational Needs

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 SENCO, draw up an Individual Action Plan for a child. If a child's needs are particularly severe they will work on an individualised programme written in consultation with appropriate staff. When planning, teachers will try to address the child's needs through simplified and modified tasks or the use of support staff.

### High Achievers

At Springdale we are aware that we have children who are capable of achieving beyond the standards for their age. Year 7 objectives have been incorporated into the Year 6 planning and some aspects have also been implemented with children in Year 5. This enables children to be stretched to their full capability and achieve high levels by the end of Year 6. Springdale also has strong links with a number of local primary schools as part of a Learning Community Network group which ensures staff have opportunities to moderate work at all stages within the Early years, KS1 and KS2 curriculum and beyond.

### Glossary

- National Curriculum for Mathematics – Outline of the Mathematics Curriculum that should be taught in all schools.
- Primary National Strategy – Primary Framework (PNS) – Framework for the teaching of Numeracy and Mathematics from Reception through to Year 6. (2006)
- Year 7 Framework – Framework for the teaching of Numeracy and Mathematics for Year 7. (Introduced to extend the National Numeracy Strategy into Secondary Teaching)
- Key Stage 2 – Junior phase of Education from Year 3 (Age 7/8) to Year 6 (Age 10/11).
- Standard Assessment Tests (SAT's) – Compulsory National tests which children undertake at the End of Year 6.
- Qualification and Curriculum Authority (QCA) – Company who produce the National Tests and Standard Schemes of Work.
- QCA Non-Statutory Tests – Optional tests written by QCA to test children at the end of Years 3, 4 and 5 against National Levels.
- SENCO – Special Needs Co-ordinator, a teacher who has the overall responsibility for the Special Educational Needs of the children.

### Appendix 1: Example Year 4 Mathematics Yearly Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Week 1	Place value	Mental multiplication incl. 6x and 9x tables	Place value Roman numerals Counting incl. negative numbers	Mental multiplication and written division incl. 7x and 11x tables	Counting and sequences (statistics)	Place value
Week 2	Place value - decimals	Mental division	Fractions and decimals	Place value	Fractions and decimals (measures)	Statistics
Week 3	Written addition and subtraction	Written multiplication	Fractions, decimals and division	Written multiplication	Fractions and written division	Addition and subtraction (statistics)
Week 4	Written addition and subtraction (problems and inverse)	Length incl. perimeter	Position and direction	2D shape and position	Measures Volume/capacity and mass	Multiplication and division
Week 5	2D shape	Statistics	Area	Addition and subtraction (statistics)	Position and area	Shape
Week 6	Time	Assess and review week	Multiplication (statistics, measures, money)	Assess and review week	Multiplication facts incl. 12x table and time	Assess and review week

#### Year 4 Autumn 1

##### Starter suggestions for Number

- Read and write numbers to 10,000.
- Count on and back in 1s, 10s or 100s from any number up to 10,000.
- Count forwards and backwards in equal steps and describe any patterns in the sequence.
- Order a set of random numbers to at least 10,000 including amounts of money and measures.
- Order a set of decimal numbers to one decimal place.
- Recall addition and subtraction facts for each number up to 20.
- Recall addition and subtraction facts for 100.
- Recall multiplication facts for 2, 3, 4, 5 and 8x tables.
- Multiply and divide whole numbers by 10 or 100 (whole number answers).

##### Starter suggestions for Measurement, Geometry and Statistics

- Recognise 2D and 3D shapes in different orientations and describe them.
- Use a variety of sorting diagrams to compare and classify numbers and geometric shapes based on their properties.
- Identify right angles and angles less than and more than a right angle.
- Estimate and compare lengths, volumes/capacities and masses.
- Read measuring scales to an appropriate degree of accuracy.
- Know the number of mm in 1cm, cm in 1m, m in 1km, g in 1kg, ml in 1l, seconds in 1 minute, minutes in 1 hour, hours in 1 day, days in each month, days in a year and leap year.
- Tell and write the time from an analogue clock and 12 and 24-hour clocks.
- Interpret data in bar charts, pictograms and tables.

#### Main learning

#### Rationale

<b>Week 1</b> Place value  Links to Framework for Mathematics Y3 – A2, A3 Y4 – A1, A3	<ul style="list-style-type: none"> <li>• Read and write numbers to at least 10 000.</li> <li>• Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones).</li> <li>• Find 0.1, 1, 10, 100 or 1000 more or less than a given number.</li> <li>• Order and compare numbers beyond 1000.</li> <li>• Identify, represent and estimate numbers using different representations, including the number line.</li> <li>• Round any number to the nearest 10, 100 or 1000.</li> </ul>	Understanding of the number system is necessary pre-requisite knowledge for any number work. Children should understand the Base 10 notion in which there are 10 numerals (0-9) and these can be organised in different ways to form any number. This is based on grouping in tens i.e. ten 1s are the same as one 10; ten 10s are the same as one 100; ten 100s are the same as one 1000 and so on. And vice versa.
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	<ul style="list-style-type: none"> <li>Solve number and practical problems that involve all of the above and with increasingly large positive numbers.</li> </ul>	
<p><b>Week 2</b> Place value, decimals and fractions</p> <p>Links to Framework for Mathematics Y3 – E2 Y4 – A1, A2, A3, D3 Y5 – A1, D1, A2, D2, A3</p>	<ul style="list-style-type: none"> <li>Read and write numbers with up to two decimal places.</li> <li>Identify the value of each digit to two decimal places.</li> <li>Count up and down in hundredths.</li> <li>Recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.</li> <li>Recognise that one hundred 1p coins are equivalent to £1 and that each coin is <math>\frac{1}{100}</math> of £1.</li> <li>Write amounts of money using decimal notation.</li> <li>Round decimals with one decimal place to the nearest whole number.</li> <li>Order and compare numbers with the same number of decimal places up to two decimal places.</li> <li>Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.</li> </ul>	<p>Children's understanding of the Base 10 number system is extended to include decimals. Children learn that decimals are a way of expressing fractions within the structure of our Base 10 number system. It is important that children see practical and visual models to understand the meaning and size of units, tenths and hundredths. In preparation for calculating with money, children should learn that one hundred 1p coins are equal to £1, so 1p is <math>\frac{1}{100}</math> of £1. This builds on their knowledge that 10p is <math>\frac{1}{10}</math> of £1.</p> <p>When multiplying and dividing by 10 and 100, it is important that children see this as scaling up and down (making amounts 10 times larger or smaller) rather than repeated addition and repeated subtraction.</p>
<p><b>Week 3</b> Addition and subtraction</p> <p>Links to Framework for Mathematics Y4 – A2, D2, A3, D3</p>	<ul style="list-style-type: none"> <li>Partition numbers in different ways (for example, <math>2.3 = 2 + 0.3</math> and <math>2.3 = 1 + 1.3</math>).</li> <li>Add and subtract numbers with up to 4 digits and decimals with one decimal place using the formal written methods of columnar addition and subtraction where appropriate.</li> <li>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).</li> <li>Select a mental strategy appropriate for the numbers involved in the calculation.</li> <li>Estimate and use inverse operations to check answers to a calculation.</li> </ul>	<p>Children learn when it is appropriate to use mental and written methods of calculation.</p> <p>Children make links with their knowledge of rounding numbers to the nearest 10, 100 and 1000 to estimate the answers to calculations. Calculations should be in contexts including, money, measures, real life problems and number enquiries.</p> <p>When calculating, children should learn which methods suit the numbers involved and why.</p> <p>Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2.</p>
<p><b>Week 4</b> Addition and subtraction, using inverse and problem solving</p> <p>Links to Framework for Mathematics Y4 – A2, D2, A3, B3, D3</p>	<ul style="list-style-type: none"> <li>Partition numbers in different ways (for example, <math>2.3 = 2 + 0.3</math> and <math>2.3 = 1 + 1.3</math>).</li> <li>Add and subtract mentally combinations of two and three digit numbers and decimals to one decimal place.</li> <li>Add and subtract numbers with up to 4 digits and decimals with one decimal place using the formal written methods of columnar addition and subtraction where appropriate.</li> <li>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).</li> <li>Select a mental strategy appropriate for the numbers involved in the calculation.</li> <li>Estimate and use inverse operations to check answers to a calculation.</li> <li>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>	<p>Children continue to work with addition and subtraction and understand the inverse relationship, using this to check calculations. Calculations should be in contexts including money, measures, real life problems and number enquiries.</p> <p>When calculating, children should learn which methods suit the numbers involved and why.</p> <p>Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2.</p>

Appendix 3: Short term weekly planning format



Unit (include title):

SPRINGDALE JUNIOR SCHOOL  
**NUMERACY HOUR – Weekly Planner**

<b>Year group:</b>	<b>Set:</b>	<b>Teacher:</b>	<b>Term:</b>	<b>Week Beginning:</b>
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**Groups:**

Table	Table	Table	Table

(include most recent assessment result)

**TA Support:**

**Whole school target:**

**APP Links:**

	<b>Mental / Oral Starter</b> (rehearse, recall, refine, reason, revisit, read)			<b>Main Activity</b>					
	Objectives	Activity	Vocabulary	Objectives	Activities (including differentiation):	Plenary / Key Questions (Review, reflect)	Target Links	Resources (incl. ICT)	
<b>Mon</b>					Direct teaching / Key questions::				
<b>Tues</b>					Direct teaching / Key questions::				
<b>Wed</b>					Direct teaching / Key questions::				
<b>Thur</b>					Direct teaching / Key questions::				
<b>Fri</b>					Direct teaching / Key questions::				
<b>Problem Solving Day / time:</b>					<b>ICT Links</b>				