



Mathematics Policy

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Person(s) Responsible	Mathematics Subject Leader

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1. Introduction

Mathematics is a core subject within the National Curriculum; this policy outlines the teaching, organisation and management of the mathematics taught and learnt at Woodloes Primary School. It is based on the 2014 expectations and aims of the 'New Curriculum' for mathematics, and the Early Years 'Development Matters' EYFS document.

This policy has been drawn up by the mathematics subject leader, shared and discussed with all staff and has the full agreement of the Governing Body.

Purpose

Mathematics is a tool for everyday life; it teaches children how to make sense of the world around them, through developing the ability to calculate, reason and solve problems. Mathematics is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real life problems.

Aims and Objectives

Our aims for all children at Woodloes Primary School are that they will:

- develop a positive attitude to mathematics and that mathematics will provide both a challenge and a sense of achievement for them;
- develop and display a competence and confidence in mathematical knowledge, concepts and skills;
- be encouraged to think out, seek out and discover ideas, looking for patterns and relationships;
- develop their mathematical language; enabling them to communicate their findings with others;
- develop the ability to solve problems, reason, think logically and to work systematically;
- work both independently as well as with others;
- use and apply mathematics across the curriculum and in real life situations.

Equal Opportunities

Mathematics lessons are planned and taught to encourage full and active participation of all children, irrespective of ability, gender, race or cultural background.

Children who have learning difficulties which impact on their mathematical progress, are identified by the SENCo/class teacher and monitored by the SENCo who will advise class teachers of suitable strategies and resources to support. In addition, class teachers take into account individual learning targets and ladders when planning and teaching mathematics sessions.

2. Procedure and Practice

Organisation

Planning and Teaching Mathematics

Early Years Foundation Stage:

The planning and teaching of mathematics within the Foundation Stage is guided by the requirements and recommendations set out in the Early Years 'Development Matters' EYFS document.

Lessons within the Early Years provide frequent opportunities for the children to develop their understanding of mathematics. They do this through a range of varied activities that allow the children to use, enjoy, explore, practise and talk about their mathematics.

Key Stages 1 and 2:

Each year group has a termly mathematics overview, identifying the specific areas to be taught and assessed. In addition to this, there is a calculations framework; identifying and sequencing the mental and written strategies taught at Woodloes Primary School (see appendix). These are based on the 2014 expectations and aims of the 'New Curriculum' for mathematics and can be found in the appendix. However, where children have specific needs, identified by the class teacher and/or SENCo, they will access the mathematical objectives and targets from a lower age group.

It is the class teacher's responsibility to plan mathematics lessons; taking into account both the year group specific termly planning objectives and Calculations Framework.

As mathematics contributes to many subjects within the curriculum, as well as being planned and taught as subject specific sessions, there will be opportunities to enable children to use and apply mathematical skills in other subject areas and real life contexts.

Resources

Resources can be found in individual classes and in the central Maths area; located in the Year 3 area. When additional resources are required, these should be ordered after consultation with the Mathematics Subject Leader.

Computing

Teachers incorporate the use of computers and iPads into their maths lessons when appropriate. Computers or iPads may be used during whole class work to provide a starting point, as well as to demonstrate concepts and encourage problem solving. They may also be used by groups of children to consolidate or further concepts.

Mathletics is used to enable all children (from Reception to Year 6) to develop the speed and accuracy of their mental calculations and to explore different Mathematical concepts. Each pupil has a log in and will be encouraged to use Mathletics to support and enhance their learning, both at home and at school. Class teachers have their own log ins which enable them to track and monitor each child's engagement and achievement. Extra school

Mathletics sessions are available, on request, for those children who do not have access to the program at home.

Marking and Feedback

All work will be marked in accordance with the School's Marking Policy. The main purpose of marking is to enable the children to progress through benefiting from constructive guidance, next steps and questioning, to both consolidate and further learning. There will be opportunities for the children to take an active role in marking by self-assessing their achievement in relation to the WALT (We are learning to...), responding to the teacher's comments and identifying their own next steps (age appropriate).

Assessments and AWOL

Early Years Foundation Stage:

The Early Years Profile provides individual assessments for each child. The information is gathered from daily observations, play partners, oral interactions and questioning. (See Early Years Foundation Stage Policy).

Key Stages 1 and 2:

At Woodloes Primary School, assessment is regarded as an integral part of teaching and learning and is a continuous process. It is the responsibility of teachers to assess all pupils in their class. These will take place at 3 connected levels: short, medium and long term. These assessments will be used to inform teaching in a continuous cycle of planning, teaching and assessment (see Assessment policy).

Children working on the key stage 1 and 2 curriculum have individual target booklets, which are used to inform AWOL assessments and identify next steps in their learning.

To enable the attainment and progress of individuals, groups and cohorts to be monitored (and future intervention requirements identified), AWOL assessments are recorded on O Track. These are based on the number of targets which the children have achieved and assess whether they are working at the beginning of the expected standard for that year group (B), towards the expected standard for that year group (W1, W2 or W3), at the expected standard for the year group (E) or exceeding the expectations for that year group (A1 or A2). Children working below age related expectations for their year group follow the targets for the year group curriculum which they are following (see Assessment Policy).

To support these assessments, each year group will take part in a termly test. However, in Years 2 and 6, the end of summer term tested assessment will take the form of a SATs test.

Termly SMT meetings will explore and analyse mathematical progress and attainment for individuals, groups, year groups and phases.

Reporting to parents

Class teachers report on children's progress during parent evenings and in each child's annual written report. This shares information on their child's attainment (including whether they are working below, towards, at, or above the expected level for their year group),

progress, ability and effort and identifies future targets. Parents with children in Years 2 and 6 will also receive their child's SATs results.

Monitoring

The monitoring of the standards of children's work, their attainment, and the quality of the learning and teaching of mathematics at Woodloes Primary School, is the shared responsibility of the SLT, SMT and the Mathematics Subject Leader.

It is also the responsibility of the Mathematics Subject Leader to keep up to date with current developments in the subject and to provide a strategic lead and direction for the subject within the school. When required, the Mathematics Subject Leader also assists staff by leading staff meetings; planning and leading in-service training activities; providing consultancy and advice, supporting staff in the classroom; specifying and ordering resources and monitoring and maintaining the condition and availability of resources.

The Governing Body is actively involved with the curriculum and is kept up to date with any developments in mathematics, as well as in other subject areas.

3. Concluding Notes

The success of the AWOL system will continue to be reviewed and adaptations made as necessary. Systems for assessing Mathematics targets within Science and the Foundation Subjects will continue to be developed.

Appendix

Appendix 1: Calculations Framework

Additional Supporting Documents:

The following documents should be used in conjunction with the Mathematics Policy:

- Woodloes Primary School Calculations Framework (see Appendix)
- Woodloes Primary School Mathematics Policy Termly Plans
- Woodloes Primary School Assessment, Marking and Feedback and Teaching and Learning Policies
- Early Years Foundation Stage Policy
- Mathematics Target Booklets

S. Barlow

Mathematics Subject Leader

Appendix 1

Calculations Framework

Introduction

2017

This sets out the mental and written calculation strategies taught at Woodloes Primary School.

It reflects a whole school agreement and has two main aims. These are to ensure that:

- calculation methods are taught consistently across the school
- parents and carers are able to support their child/children with their mathematical calculations



Vocabulary

It is important that the children are able to use and understand a variety of words relating to each of the four operations. These include the following:

Subtraction

Subtract
Take away
Minus
Less than
Find the difference
Decrease
Leave

Division

Divide
Share
Equal groups of
Remainder
Divisor
Repeated subtraction
Halve
Divisible by
Quotient

Multiplication

Multiply
Lots of
Product
Groups of
Times
Repeated addition
Multiples of
Double

Addition

Add
Total
Plus
More than
And
Altogether
Increase
Equals
Make
Sum of

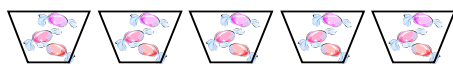
MULTIPLICATION

Stage 1 -

Practical, pictorial and symbols:

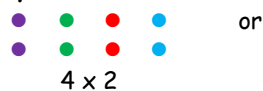
There are 3 sweets in one bag.

How many sweets are there in 5 bags?



Stage 2 -

Arrays:



$$4 \times 2$$

or



$$2 \times 4$$

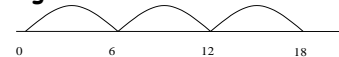
Repeated Addition

$$2 + 2 + 2 + 2 \quad \text{or} \quad 4 + 4$$

Stage 3 -

Number lines:

E.g. 6×3



Hundred Square to count in multiples.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Stage 4 -

Grid method:

E.g. $35 \times 2 = 70$

$$\begin{array}{r|rr} \times & 30 & 5 \\ 2 & 60 & 10 \\ \hline & 60 & 10 \\ & 70 & \end{array}$$

E.g. $123 \times 3 = 369$

$$\begin{array}{r|rrrr} \times & 100 & 20 & 3 \\ 3 & 300 & 60 & 9 \\ \hline & 300 & 60 & 9 \\ & 369 & \end{array}$$

Stage 4 -

Partitioning:

$$\begin{aligned} \text{E.g. } 35 \times 2 &= (30 \times 2) + (5 \times 2) \\ &= 60 + 10 \\ &= 70 \end{aligned}$$

Progresses to Column Algorithm

$$\begin{array}{r} 35 \\ \times 2 \\ \hline 60 \quad (2 \times 30) \\ 10 \quad (2 \times 5) \\ \hline 70 \end{array}$$

Once shown both methods, children choose their preferred method.

Stage 5 -

Grid method: 72×38

$$\begin{array}{r|rr} \times & 70 & 2 \\ 30 & 2100 & 60 \\ 8 & 560 & 16 \\ \hline & 2100 & 60 \\ & 560 & 16 \\ & 27136 & \end{array}$$

Progressing to using the grid method for decimals.

Stage 5 -

Compact Algorithm:

$$\begin{array}{r} 38 \\ \times 72 \\ \hline 76 \\ 2656 \\ \hline 27136 \end{array}$$

Progressing to larger numbers and decimals.

DIVISION

Stage 1 -

Pictorial representation and recording of the problem:

6 sweets are shared between 2 people. How many sweets do they have each?



Stage 2 -

Practical use of apparatus to calculate the answer using the concept of sharing:

6 sweets are shared between 2 people/groups. How many do they have each?



Introduce use of a division number sentence to record the problem:

$$6 \div 2 = 3$$



Stage 3 -

Division with remainders:

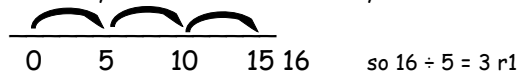
$$16 \div 5 = 3 \text{ r}1$$

(1) **Grouping**- How many groups of 5 are there and how many left over (the remainder)?

x	x	x	x	x
x	x	x	x	x
x	x	x	x	x
x				

3 groups of 5 with a remainder of 1 so $16 \div 5 = 3 \text{ r}1$

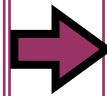
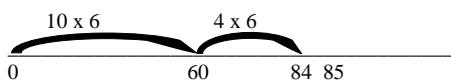
(2) **Using repeated addition** (linked to tables facts) - How many 5's are in 16 and how many are left over?



Stage 4 -

Using known multiplication facts and a blank number line:

$$85 \div 6 = 14 \text{ r}1$$



Stage 5 -

Chunking:

$$72 \div 5$$

$$\begin{array}{r} 5 \overline{) 72} \\ - 50 \text{ (10 x 5)} \\ \hline 22 \\ - 20 \text{ (4 x 5)} \\ \hline 2 \end{array}$$

Answer 14 remainder 2



Stage 6 -

Formal written method:

$$\begin{array}{r} 32 \\ 5 \overline{) 160} \end{array}$$

Progressing to larger numbers and decimals.

A D D I T I O N

Stage 1 -

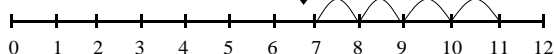
Pictorial representation and recording of the problem:



How many apples altogether?

Leading on to using numerals:

$$3 + 1 = 4$$

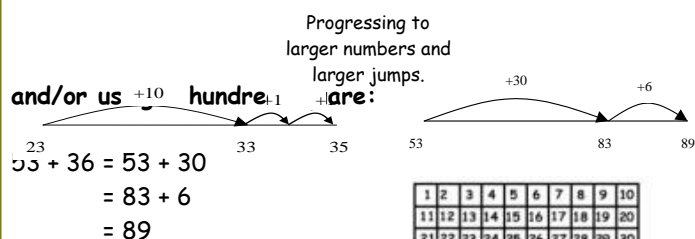


Stage 3 -

Using a blank number line:

$$\begin{aligned} 23 + 12 &= 23 + 10 + 1 + 1 \\ &= 33 + 1 + 1 \\ &= 35 \end{aligned}$$

$$\begin{aligned} 53 + 36 &= 53 + 30 + 6 \\ &= 83 + 6 \\ &= 89 \end{aligned}$$



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Stage 4 -

Partitioning numbers into tens and ones:

$$\begin{aligned} 83 + 42 &= (80 + 40) + (3 + 2) \\ &= 120 + 5 \\ &= 125 \end{aligned}$$

Stage 5 -

Expanded method - adding the least significant digit first in preparation for carrying:

$$\begin{array}{r} 358 \\ + 73 \\ \hline 11 \text{ (8 + 3)} \\ 120 \text{ (70 + 50)} \\ 300 \text{ (300 + 0)} \\ \hline 431 \end{array}$$

Stage 6 -

Formal written method:

$$\begin{array}{r} 358 \\ + 73 \\ \hline 431 \\ 11 \end{array}$$

Progressing to larger numbers and decimals.

SUBTRACTION

Stage 1 -

Pictorial representation and recording of the problem:



What is one less than 4?
Leading on to using numerals.

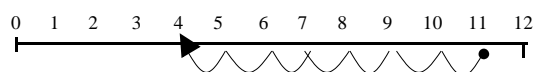
$$4 - 1 = 3$$



Stage 2 -

Using number lines to count back in ones:

$$11 - 7 = 4$$



Stage 3 -

Partitioning the second number:

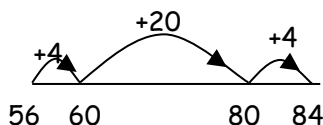
$$\begin{aligned} 74 - 27 &= 74 - 20 - 7 \\ &= 54 - 7 \\ &= 47 \end{aligned}$$



Stage 4 -

Find the difference by counting up from the smaller number to the larger number (complementary addition):

$$84 - 56 = 28$$



Stage 5 -

Formal written method for subtraction:

$$\begin{array}{r} 89 \ 12 \\ - 38 \\ \hline 54 \end{array}$$

Progressing to larger numbers and decimals.

FRACTIONS

Stage 1 - sharing and grouping

Linked to division, children to share and group into halves and quarters, progressing to thirds.



Stage 2 - same denominator calculations

Children to add and subtract fractions with the same denominator within one whole (for example: $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) using visual representations and a fraction wall to support calculations.



Stage 3 - Same denominator calculations beyond one whole

Children to use a fraction wall to visually and practically see how fractions compare with one another.

Children to use the fraction wall to add fractions with the same denominator beyond a whole (for example:



Stage 4 - Calculations using multiples of a given denominator (Children need to have a good knowledge of equivalent fractions prior to this stage).

Children to be encouraged to use a fraction wall to find equivalent fractions to enable them to calculate for example: $\frac{3}{4} + \frac{3}{8} = \frac{6}{8} + \frac{3}{8} = \frac{9}{8}$ or 1 whole and $\frac{1}{8}$



Stage 5 - Multiplying proper fractions and mixed numbers by whole numbers

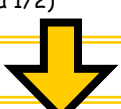
Children to multiply fractions and mixed numbers by whole numbers (supported by materials and diagrams) using the term lots of (for example: $2 \times \frac{3}{8} = \frac{6}{8}$ said as 2 lots of $\frac{3}{8}$)



Stage 6 - Multiplying simple pairs of proper fractions

Children to multiply simple pairs of proper fractions, writing the answer in its simplest form (for example: $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)

Children to use the terminology 'of' when multiplying fractions (eg: $\frac{1}{4}$ of a $\frac{1}{2}$)



Stage 7 - Dividing proper fractions by whole numbers

Children to divide proper fractions by whole numbers (for example: $\frac{1}{3} \div 2 = \frac{1}{6}$) using the terminology 'what is ___ shared between ___?' (for example: 'what is $\frac{1}{3}$ shared between 2?')