

Walmore Hill Primary School

Calculation Strategies Policy

Date of Ratification:		Signed: Brett Stevenson (HEAD TEACHER) Stephen McMillan (CHAIR OF GOVERNORS) John Henry (CHAIR OF GOVERNORS)
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Introduction

This policy has been produced to ensure consistency and progression in teaching throughout Walmore Hill Primary School.

The Primary Framework for Mathematics provides a structured and systematic approach to the teaching of calculation. There is considerable emphasis on teaching mental calculation methods.

Children are introduced to the processes of calculations through practical, oral and mental activities. Through these activities, they consolidate their understanding of number facts and begin to develop ways of recording to support their thinking and calculation methods.

As children's mental and informal 'jotting' methods are strengthened, they become ready to use more efficient written methods.

Children should be encouraged to see mathematics as both a written and spoken language. Teachers and other adults working with children in supporting mathematics should support and guide children in learning through the following important stages:

- developing the use of pictures and a mixture of words and symbols to represent numerical activities;
- using standard symbols and conventions;
- use of jottings to aid a mental strategy;
- use of pencil and paper procedures;

Through teaching and learning we ensure that children:

Have a secure knowledge of number facts and a good understanding of the four operations.

Understand the relationships between numbers.

Are able to use this knowledge to carry out calculations mentally and to apply general statements when using one-digit and two-digit numbers and particular strategies to special cases involving bigger numbers.

Make use of diagrams and informal jottings to help record steps and part answers when using mental methods that generate more information than can be kept in their heads.

Have an efficient and reliable written method of calculation for each operation that children can apply with confidence when undertaking calculations that they cannot carry out mentally.

Aims

It is our aim at Walmore Hill Primary School that by the end of Year 6...

- children will be equipped with mental and written methods that they understand and use correctly and appropriately for the calculation required (see appendix 1).
- that when faced with a calculation, children should also have the strategies to check its accuracy.
- children to be able to select an efficient method of their choice (whether this be mental or written) that is appropriate for a given task.

They will do this by always asking themselves:

- Can I do this in my head?
- Can I use drawings and jottings?
- Do I need to use a pencil and paper procedure?

Objectives

At Walmore Hill Primary School, we follow the Primary National Curriculum for Mathematics. The wording of learning objectives must be altered to suit the ability of the children to ensure they understand what they are learning at an age appropriate level.

Methods are designed to be taught to the level the children are working at rather than in specific year group e.g. in Year 2, strategies for Level 1, 2 and 3 could be taught according to the ability of the children. Despite children being taught levelled written methods; they should not be discouraged from using previously taught methods with which they are secure, while the new concepts are becoming embedded. The long term aim is for the children to be able to select an efficient method of their choice that is appropriate for a given task.

As a partnership we have decided to follow the Hamilton Trust calculation strategies. Please see appendix 1.

Overview of KS1

Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, they will develop an understanding of how numbers work, so that they are confident in 2-digit numbers and beginning to read and say numbers above 100. A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and

ensures that all children leave Y2 knowing the pairs of numbers which make all the numbers up to 10 at least.

They will also have experienced and been taught pairs to 20. Their knowledge of number facts enables them to add several single-digit numbers, and to add/subtract a single digit number to/from a 2-digit number. Another important conceptual tool is their ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of ten to and from any 2-digit number. The most important application of this knowledge is their ability to add or subtract any pair of 2-digit numbers by counting on or back in tens and ones. Children may extend this to adding by partitioning numbers into tens and ones.

Children will be taught to count in 2s, 3s, 5s and 10s, and will have related this skill to repeated addition. They will have met and begun to learn the associated 2x, 3x, 5x and 10x tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. They will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division. Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Overview of lower KS2

In the lower juniors, children build on the concrete and conceptual understandings they have gained in the Infants to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the 'counting in ones' or fingers-based methods of the infants. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions.

Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced. This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-

digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers, e.g. when dividing by 5 or multiplying by 20.

Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals, multiplying and dividing whole numbers by 10 and 100.

Overview of upper KS2

Children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions. They will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to two decimal places.

Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as $40,000 \times 6$ or $40,000 \div 8$. In addition, it is in Y5 and Y6 that children extend their knowledge and confidence in using written algorithms for multiplication and division.

Fractions and decimals are also added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers, and they will also calculate simple percentages and ratios. Negative numbers will be added and subtracted.

Appendix 1: addition and subtraction

Appendix 2: multiplication and division