Grimsdyke School
Written Calculations Policy
Year 1

Approved by:	Governing Body	**Date:**	06.05.22
Last reviewed on:	May 2022		
Next review due by:	May 2024		

Rationale

This policy contains the key pencil and paper procedures that will be taught within our school. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement. The calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics, and is also designed to give pupils a consistent and smooth progression of learning in written calculations across the school. Please note that early learning in number and calculation in Reception follows the 'Development Matters' EYFS document, and this calculation policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

Teaching and Learning

This calculation policy should be used to support children to develop a deep understanding of number and calculation. At Grimsdyke School, we use 'White Rose' as a format as a basis for our planning and use the philosophy of: fluency, reasoning and problem solving. White Rose also follows the Concrete – Pictorial – Abstract approach to teaching maths. This policy has been designed to teach children through the use of concrete, pictorial and abstract representations. It is important that conceptual understanding, supported by the use of representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

- Concrete representation - a pupil is first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is a foundation for conceptual understanding.
- Pictorial representation - a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem. This helps children make the connection between the physical object and abstract levels of understanding, which is the stage they move onto next.
- Abstract representation - The abstract stage brings in mathematical symbols, for example +, -, x, ÷ to indicate addition, subtraction, multiplication and division. This is used when a pupil is secure in their understanding of representing problems by using mathematical notation, for example 12 x 2 = 24.

Planning, Progression and Continuity

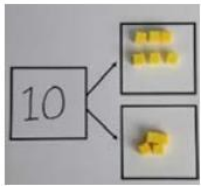
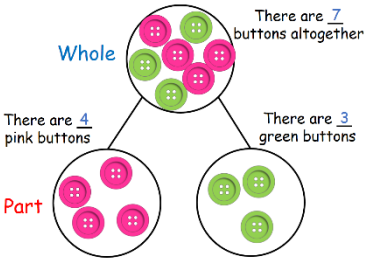
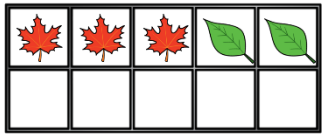
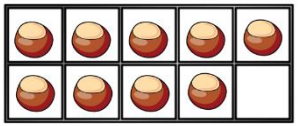
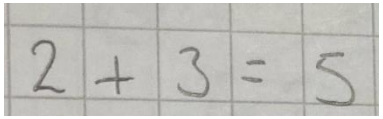
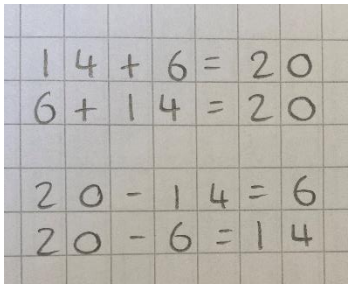
The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014, however it is vital that pupils are taught according to the year group that they are currently working at and then given 'mastery' opportunities within their age-related expectations in order to fully embed the concepts learned. Furthermore, if a teacher feels a child is ready to move onto the next stage of a calculation which is in the next year group's expectations, then this should be facilitated.

At the centre of the mastery approach to the teaching of mathematics is the belief that all children have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through

the use of concrete materials and pictorial representations. This policy outlines the different calculation strategies that should be taught and used in Year 1 to Year 6 in line with the requirements of the 2014 Primary National Curriculum. Each operation is broken down into skills for the year group and shows recommended models and visuals to support the teaching of the corresponding concepts alongside.

'Real things and structured images enables children to understand the abstract. The concrete and the images are a means for children to understand the symbolic so it's important to move between all modes to allow children to make connections'. (Morgan, D. 2016)

Addition

Objectives	Concrete	Pictorial	Abstract
• *To know that equals means the same as* • *To know that a number bonds join numbers together to make another number* • *To know the number bonds up to 20* • *To know that addition is finding the total of two or more numbers or objects* • *To know the mathematical symbols for addition (+)* • *To know that adding a zero has no effect on the answer* • *To know different terminology for addition such as put together, add, altogether, total, more than* • *To identify and say one more than a given number* • *To add one-digit and two-digit numbers to 20, including zero* • *To read, write and interpret mathematical*	Use cubes to add two numbers together as a group or in a bar.  Use part-part whole model  Adding 1 with string beads 	Part whole model  Number bonds to 10  Adding together  There are 3 There are 2 There are 5 leaves altogether. 	Notation for addition  Number bonds to 20 

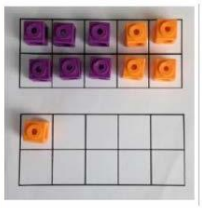
statements involving addition

- *To solve one-step problems that involve addition using concrete objects and pictorial representations*

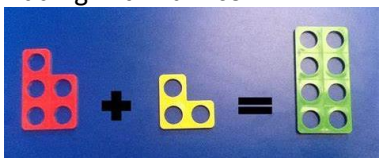
Vocabulary

- *Add*
- *More*
- *Plus*
- *Make*
- *Altogether*
- *Total*
- *Equal to*
- *Equals*
- *Count on*
- *Number line*
- *Balancing*
- *Part part whole*

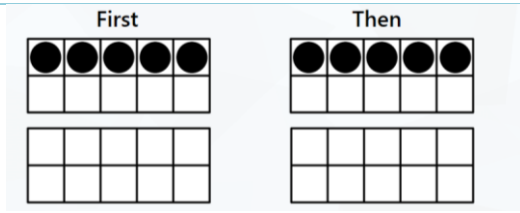
Use ten frames



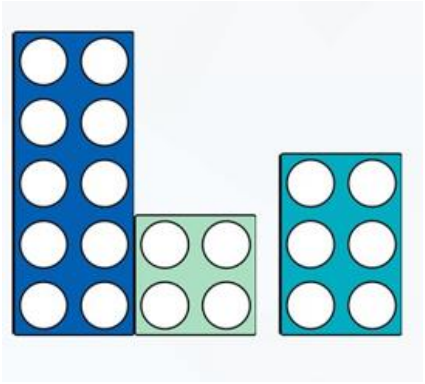
Adding with numicon



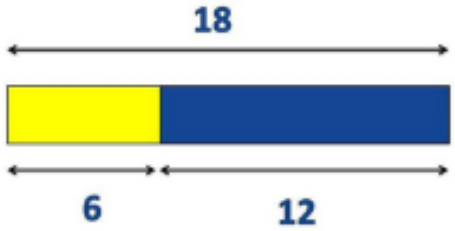
Addition with base 10



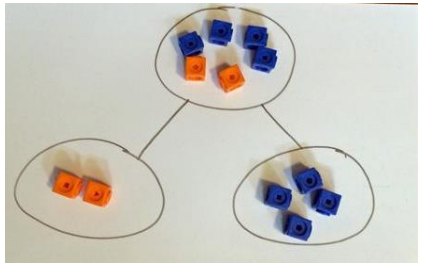
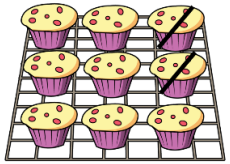
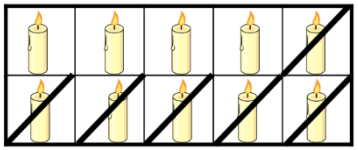
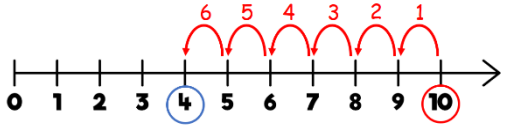
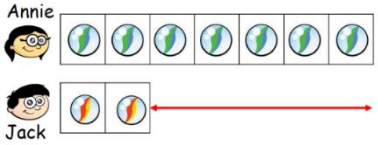
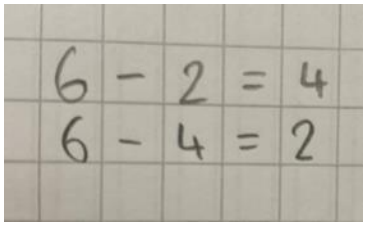
Finding number bonds to 20



Addition with bar models

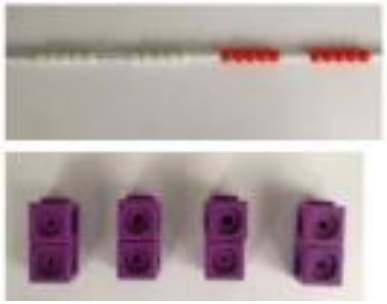
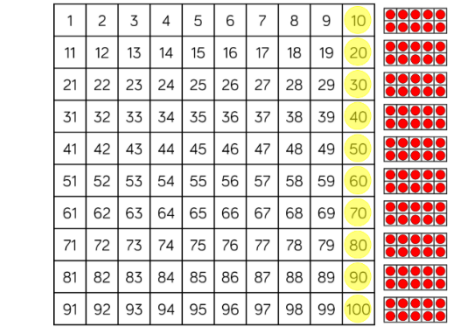
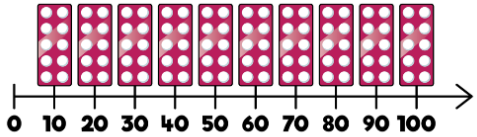
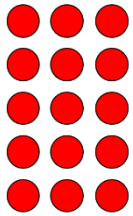
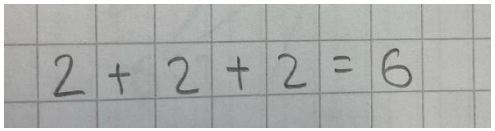
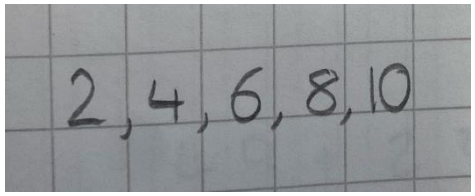


Subtraction

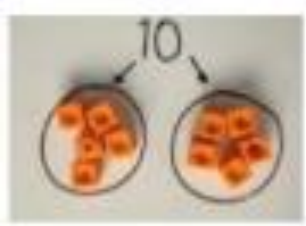
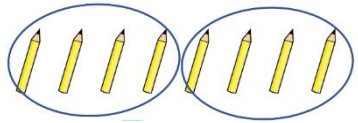
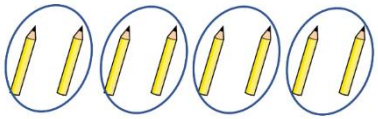
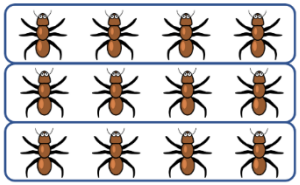
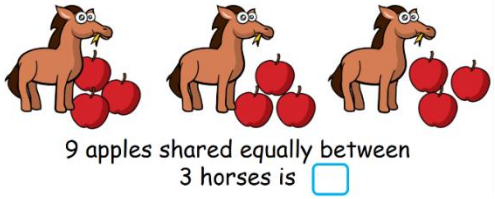
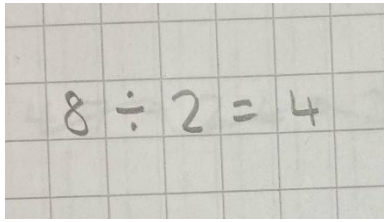
Objectives	Concrete	Pictorial	Abstract
• *To know that subtraction means taking away to find how many are left.* • *To know the mathematical symbols for subtraction (-) and equals (=) signs* • *To know that subtracting a zero has no effect on the answer* • *To know different terminology for subtractions such as take away, distance between, difference between and less than* • *To use number bonds and related subtraction facts within 20* • *To subtract one-digit and two-digit numbers to 20, including zero* • *To read, write and interpret mathematical statements involving the subtraction (-) and equals (=) signs* • *To solve one-step problems that involve subtraction, using concrete*	Part whole model  Tens frame 	Subtraction by crossing out – how many left?  First there were 9 cupcakes. Then Chase ate 2 cupcakes. Now there are 7 cupcakes.  Subtraction by counting back How many more to make 10? (link with addition)  Finding the difference 	Subtract 1-digit numbers 

objects and pictorial representations, and missing number problems such as 7 = □ - 9 ***Vocabulary*** • *Subtraction* • *Take away* • *Difference between* • *Less* • *Less than* • *Fewer* • *Fewer than* • *Minus*			

Multiplication

Objectives	Concrete	Pictorial	Abstract
• *To know that even numbers are numbers ending in 2,4,6,8 and 0* • *To know that odd numbers are numbers ending in 1,3,5,7 and 9* • *To know the twos, fives and ten times tables* • *To know that multiplication is repeated addition* • *To count in multiples of twos, fives and tens* • *To solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher*	Counting in multiples  Repeated addition 	Counting in 10s   Using arrays 	Repeated addition  Counting in twos 
Vocabulary • *Even* • *Odd* • *Twos, Fives, Tens* • *Times* • *Multiply* • *Groups of* • *Lots of* • *Array*			

Division

Objectives	Concrete	Pictorial	Abstract
• *To know that division is breaking a number up into equal parts, and finding out how many equal parts can be made* • *To know different terminology for division such as sharing, grouping* • *To know that a half is one of two equal parts of an object, shape or quantity* • *To know that a quarter is one of four equal parts of an object, shape or quantity* • *To know that a fractions is splitting a whole (number/shape etc) into parts* • *To solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher*	Share into equal groups 	Making equal groups    Sharing 	Notation for division 

• *To find and name quarter of an object, shape or quantity* • *To find half a length, quantity, set of objects or shape* ***Vocabulary*** • *Groups* • *Share* • *Equal* • *Half* • *Quarter* • *Array*			

Written – May 2022

Next Review – May 2024