EARL SPENCER PRIMARY SCHOOL

Manipulatives and Representations

EYFS to Year 6

Created by: Leanne Rowley

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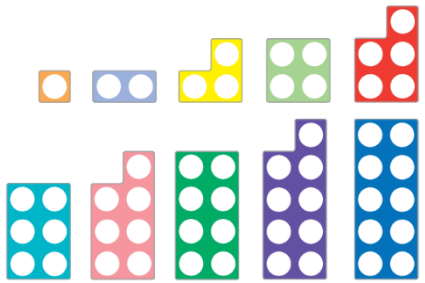
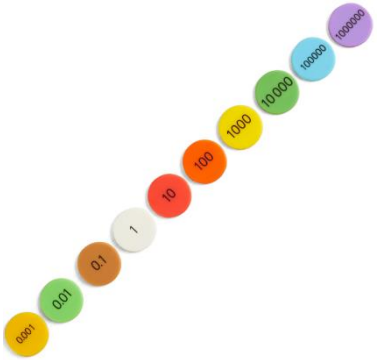
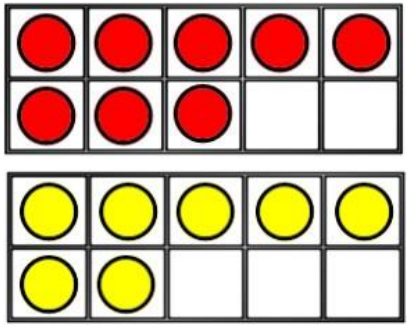
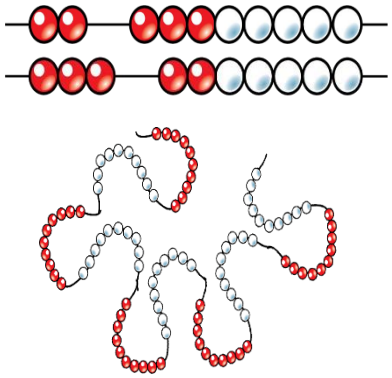
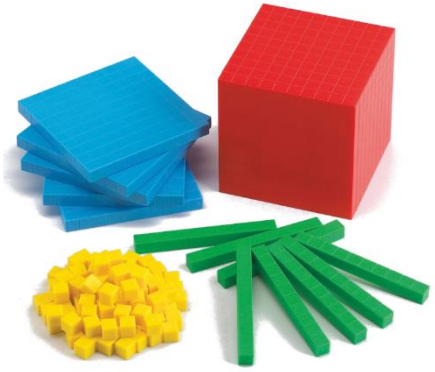
Rationale

This policy has been made in alignment with the use of The White Rose schemes of learning. This document outlines the whole school approach to using manipulatives and representations. Earl Spencer Primary School use a mastery approach for teaching mathematics including the use of the concrete-pictorial-abstract (CPA) approach. Our aim being for all children to be provided with the opportunity to master mathematical concepts.

The use of manipulatives is essential in the teaching of mathematics in order to embed that understanding of key mathematical concepts. Across our school you will see manipulatives being used with all children no matter their age or ability level.

Following the CPA approach, key representations are used across our school in order for children to move from the concrete, to the pictorial seamlessly. The use of consistent representations across our school means that children can apply a range of known and well understood representations to a range of problems and contexts as they move through the school. This understanding of how to represent problems and mathematical knowledge will help children to move from the concrete, to the pictorial.

Manipulatives

Number shapes 	**Cubes** 	**Counters** 	**Tens Frames** 
Bead Strings 	**Base 10** 	**Cuisenaire rods** 	**Rekenreks** 

Progression in the use of manipulatives

	Number shapes	Cubes	Counters	Tens frames	Bead strings	Base 10	Cuisenaire rods	Rekenreks
Year 1	Number bonds to 10 One more and less Place value Doubles	Counting on Counting backwards Parts and wholes Number bonds within 10 Addition of single digits Subtraction of single digits x- arrays ÷ - sharing	Fact families One more and less Addition of single digits Subtraction of single digits x – arrays ÷ - sharing	Place value – representing numbers Place value - TO One more and less Fact families Number bonds to and within 10 Addition Subtraction Doubles and near doubles Related facts within 10 x – counting in tens	Place value – TO Number bonds to 10 One more and less Addition Subtraction	Place value – TO Addition over 10 Subtraction x – counting in tens	One more and less	Place value – TO Number bonds to 10 Addition Subtraction

	Number shapes	Cubes	Counters	Tens frames	Bead strings	Base 10	Cuisenaire rods	Rekenreks
Year 2	One more and less Number bonds to 10 Odd and even Doubling and	Addition of single digits Subtraction of single digits. x – arrays ÷ - grouping/	Place value – TO Addition of single digits Subtraction of single digits	Place value – TO One/ten more and less Number bonds to 10 and 20	Place value – TO Addition Subtraction	Place value – TO Counting in 10's Finding related facts	One more and less Ten more and less Fractions – equal parts	Place value – TO Counting in 2's 5's and 10's Number bonds to 10 and 20

	halving	sharing	x - equal groups x – arrays ÷ - grouping/ sharing Fractions – equal parts	Fact families Addition Subtraction x - equal groups odd and even Fractions – equal parts		Addition Subtraction including exchanging x – equal groups		Addition Subtraction

	Number shapes	**Cubes**	**Counters**	**Tens frames**	**Bead strings**	**Base 10**	**Cuisenaire rods**	**Rekenreks**
Year 3	Multiplication Division	x – equal groups ÷ - sharing and grouping Scaling Unit fractions	Place value – HTO Find 1, 10 and 100 more and less Number bonds within 10 Addition Subtraction Formal written methods for +/- Making connections between HTO x – arrays x – multiples of 2, 5 and 10 ÷ sharing and grouping Related facts x – 2 digit by 1 digit ÷ 2 digit by 1	Place value – TO Addition Subtraction within 100 x – multiples of 10 Counting in tenths	Place value – TO Addition Subtraction Understanding tenths	Place value – HTO Represent and Partitioning numbers to 100/1000 Find 1, 10 and 100 more and less Count in 50s Addition Subtraction within 100 Formal written methods for +/- Making connections between HTO x – multiples of 10 Related facts x – 2 digit by 1 digit	Find 1, 10 and 100 more and less Scaling Unit fractions Fractions – equivalence Counting in tenths	Addition Subtraction

			digit Counting in tenths			÷ 2 digit by 1 digit		

	Number shapes	Cubes	Counters	Tens frames	Bead strings	Base 10	Cuisenaire rods	Rekenreks
Year 4	Multiplication Division	Efficient subtraction	Represent numbers to 1,000/10,000 Place value – partitioning to 1,000/10,000 Find 1, 10, 100 and 1,000 more and less Comparing numbers Round to nearest 100 Addition within 1,000 Formal written methods for +/- Multiplication Division Factors Related facts Formal written methods for x / ÷ Efficient x and ÷ Converting	Find 1, 10, 100 and 1,000 more and less Related facts	Addition Subtraction Understanding tenths Decimals	Represent numbers to 1,000/10,000 Place value – partitioning to 1,000/10,000 Find 1, 10, 100 and 1,000 more and less Comparing numbers Round to the nearest 100 Addition within 1,000 Subtraction - exchanging Formal written methods for +/- Multiplication Division Related facts Formal written methods for x and ÷	Dividing a number by itself and 1 Fractions – whole Mixed numbers Improper fractions Equivalent fractions Fraction families	Addition Subtraction Tenths as fractions Hundredths as fractions

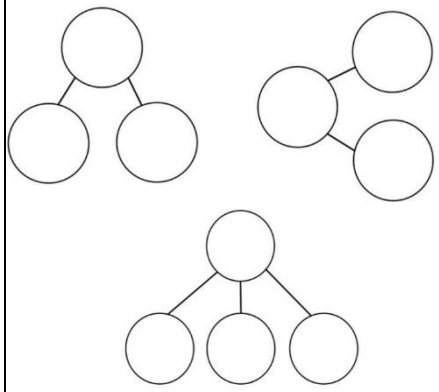
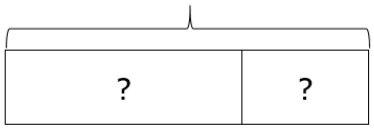
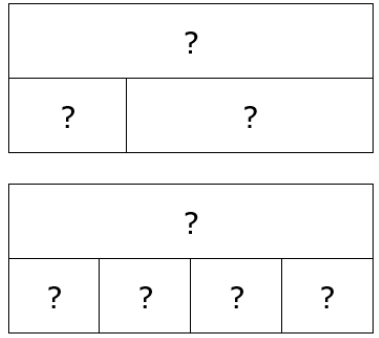
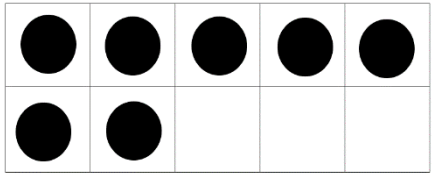
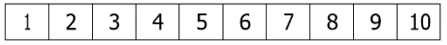
			fractions Tenths as decimals					

	Number shapes	Cubes	Counters	Tens frames	Bead strings	Base 10	Cuisenaire rods	Rekenreks
Year 5	Multiplication Division	Square Numbers Cube Numbers Mixed numbers and improper fractions	Represent numbers to 10,000/100,000/ 1,000,000 Mental strategies for +/-/x/÷ Written methods for +/-/x/÷ Multiples Factors Square Numbers Short division Dividing with remainders Fractions of a quantity Decimals – tenths, hundredths, thousandths	Find 100, 1,000, 10,000 and 100,000 more and less Related facts	Addition Subtraction Understanding tenths Decimals	Represent numbers to 10,000/100,000/ 1,000,000 Mental strategies for +/-/x/÷ Written methods for +/-/x/÷ Decimals	Equivalent Fractions Unit Fractions Converting fractions +/- fractions x unit fractions Use fractions as operators	Addition Subtraction Tenths and hundredths as fractions Hundredths and thousandths as fractions

	Number shapes	Cubes	Counters	Tens frames	Bead strings	Base 10	Cuisenaire rods	Rekenreks
Year 6	Multiplication Division	Ratio Form expressions Substitution	Represent, order and compare numbers to	Fractions of an amount	Negative Numbers Ratio Addition Subtraction	Negative Numbers Form equations	Equivalent fractions and simplifying Compare and	Negative Numbers Ratio

		Form equations	1,000,000, 10,000,000 Powers of 10 Compare and order integers Rounding integers Negative Numbers Ratio Place Value within 1 +/- decimals x and ÷ by 10, 100 and 1,000 x and ÷ decimals by integers		Understanding tenths/hundredths /thousandths Decimals		order fractions +/- fractions Multiplying fractions by integers Fractions of an amount Decimal equivalence Understand percentages	

Representations

Part Whole Models 	**Bar models (single)** 	**Bar models (multiple)** 	**Tens and Ones** 
Tens Frame 	**Number Tracks** 	**Number lines (marked and blank)**