Progression of skills: Maths - Multiplication and Division

Curriculum intent:

At Shawclough, our intent for Mathematics is to teach a rich, balanced and progressive curriculum using Maths to reason, problem solve and develop fluent conceptual understanding I n each area. Our curriculum allows children to better make sense of the world around them by making connections between Mathematics and everyday life. Our policies, resources and schemes of work support our vision and clearly outline where Maths can be incorporated across different curriculum areas. The structure of the Mathematics curriculum across school shows clear progression in line with age related expectations. Teaching curriculum content in blocks allows children to explore skills and knowledge in depth and gain a secure understanding of particular subject matter. Key knowledge and skills are also revisited regularly allowing repetition to embed learning. A concrete, pictorial, abstract approach provides children with a clear structure in which they can develop their depth of understanding of mathematical concepts. We aim to ensure that Mathematics is a high profile subject which children view positively and with a 'Can do' attitude.

For the youngest children developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationship between and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding- such as using manipulative, including small pebbles and tens frames for organising counting – children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes

Intended Experiences **Nursery**	**Intended experiences** **Reception**	**Early Learning Goal**
To be interested in and sing number songs To refer to numbers in play e.g. 'I have one, you have two To say one number for each item in order: 1, 2,3,4,5? · To begin to learn how to touch count and line up objects (one-one) To recite numbers past 5 To recognise some numerals in the environment. To begin to recognise of up to 3 objects, without having to count them individually ('subitising')? To begin to experiment with their own symbols and marks as well as numerals To show 'finger numbers' up to 5. To make comparisons between quantities. To match number to quantity To show numbers to 5 using concrete resources and say one number name for each item. To recognise numbers to 5, match numeral and quantity to 5 and quickly say how many there are (up to 3) · To solve some simple problems with numbers to 5. To compare quantities using the vocabulary greater, less, more, fewer and the same	To quickly say how many there are (up to 3) in different arrangements · To start to show how numbers can be made up e.g. 1 and 3 is 4 and know there is more than one way of doing this To count objects, claps, movements up to 10 · To match numeral and quantity (within 10). To quickly say how many there are (up to 5), recall number bonds to 5 and start to give some linked subtraction facts · To begin to recall some double facts e.g. 1 and 1 is	Have a deep understanding of number to 10, including the composition of each number. · Subitise (recognise quantities without counting) up to 5. · Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

MULTIPLICATION & DIVISION FACTS					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Count in multiples of twos, fives and tens (copied from Number and Place Value)	Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward or backward (copied from Number and Place Value)	Count from 0 in multiples of 4, 8, 50 and 100 (copied from Number and Place Value)	Count in multiples of 6, 7, 9, 25 and 1000 (copied from Number and Place Value)	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 (copied from Number and Place Value)	
	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.	Recall multiplication and division facts for multiplication tables up to 12 x 12.		
MENTAL CALCULATION					

		Write and calculate mathematical statements for multiplication and division, using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Written Methods).	Use place value, known and derived facts to multiply and divide mentally, including: Multiplying by 0 and 1; dividing by 1; multiplying together three numbers.	Multiply and divide numbers mentally, drawing upon known facts.	Perform mental calculations, including with mixed operations and large numbers.
	Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.		Recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers)	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8) (copied from Fractions)
WRITTEN CALCULATION					
	Calculate mathematical statements for multiplication and division, within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs.	Write and calculate mathematical statements for multiplication and division, using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	Multiply two-digit and three-digit numbers by a one-digit number, using formal written layout.	Multiply numbers up to 4 digits by a one- or two-digit number, using a formal written method, including long multiplication for two-digit numbers.	Multiply multi-digit numbers up to 4 digits by a two-digit whole number, using the formal written method of long multiplication.

		(appears also in Mental Methods).			
				Divide numbers up to 4 digits by a one-digit number, using the formal written method of short division and interpret remainders appropriately for the context.	Divide numbers up to 4-digits by a two-digit whole number, using the formal written method of short division where appropriate for the context, divide numbers up to 4 digits by a two-digit whole number, using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
					Use written division methods in cases where the answer has up to two decimal places (copied from Fractions (including decimals)).
PROPERTIES OF NUMBERS; MULTIPLES, FACTORS, PRIMES, SQUARE AND CUBE NUMBERS					
			Recognise and use factor pairs and commutativity in mental calculations (repeated)	**Identify mulitples and factors, including finding all factor pairs of a number, and common factors of two numbers.**	Identify common factors, common multiples and prime numbers. Use common factors to simplify fractions; use common multiples to

				Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19.	express fractions in the same denomination (copied from Fractions).
				Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	Calculate, estimate and compare volume of cubes and cuboids, using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3 (copied from Measures)
ORDER OF OPERATIONS					
					Use their knowledge of the order of operations to carry out calculations involving the four operations.
INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS					
		Estimate the answer to a calculation and use inverse operations to check answers	Estimate and use inverse operations to check answers to a calculation		Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

		(copied from Addition and Subtraction).	(copied from Addition and Subtraction).		
PROBLEM SOLVING					
Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the Teacher.	Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one-digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	Solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes.	Solve problems involving addition, subtraction, multiplication and division.
				Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.	
				Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	Solve problems involving similar shapes where the scale factor is known or can be found (copied from Ratio and Proportion).
VISUAL CALCULATION POLICY					
Multiplication M1: Groups – 155 M3: Arrays – 159 Multiplication Calculation – 18	**Multiplication** M1: Repeated Addition – 156 M2: Repeated Addition – 157	**Multiplication** Mx3: Table Facts – 269 Mx4: Table Facts – 270 Mx6: Table Facts – 272 Mx8: Table Facts – 274	**Multiplication** Mx7: Table Facts – 273 Mx9: Table Facts – 275 Mx11: Table Facts – 277 Mx12: Table Facts – 278	**Multiplication** M8: Grid Method – 173 M8a: Grid Method – 174	**Multiplication** M8d: Decimal Grid – 177 M8e: Grid Method – 178

Multiplication Vocabulary – 14 **Division** D1: Sharing – 218 D2: Grouping – 219 Division Calculation – 19 Division Vocabulary – 15	M2a: Repeated Addition – 158 M3: Arrays – 160 Mx2: Table Facts – 268 Mx5: Table Facts – 280 Mx10: Table Facts – 276 **Division** D3: Division as Sharing – 220 D4: Division as Grouping – 221 D5: Grouping on a Number Line – 222 D5a: Grouping on a Number Line – 223	M4: Multi Boing! – 161 M4a: Partitioning – 162 M5: Grid Method – 163 M6: Expanded Column – 166 M7 (Additional): Column Multiplication – 169 **Division** D6: Grouping Grid – 224 D7: Chunking Jump – 225 D7a: Chunking Jump – 226 D8: Find the Hunk – 227 D8a: Find the Hunk – 228 D10 (Additional): Short Division – 237 D10 (Additional a): Short Division – 238 D11 (Additional): Chunking – 245 D11 (Additional a): Chunking - 246	M5a: Grid Method – 164 M5b: Grid Method – 165 M6 (Additional a): Expanded Column – 167 M6: Expanded Column – 168 M7 (Additional a): Column Multiplication – 170 M7: Column Multiplication – 171 M7a: Column Multiplication – 172 **Division** D9: Mega Hunk – 229 D10: Short Division – 239 D11: Chunking – 247 D11b: Chunking - 248	M8b: Grid Method – 175 M8c: Decimal Method – 176 M9: Long Multiplication – 180 M9a: Long Multiplication – 181 M9b: Long Multiplication – 182 M9c: Long Multiplication – 183 **Division** D9c: Mega Hunk! – 230 D9b: Mega Hunk! – 231 D9e: Mega Hunk! – 232 D9f: Mega Hunk! – 233 D10c: Short Division – 240 D10d: Short Division – 241 D10e: Short Division – 242 D10f: Short Division – 243 D11c: Chunking – 249 D11d: Chunking – 250 D11e: Chunking – 251 D11f: Chunking - 252	M8f: Grid Method – 179 M9d: Column Multiplication – 184 M9e: Column Multiplication – 185 M9f: Long Multiplication – 186 M9g: Long Multiplication – 187 **Division** D9g: Mega Hunk! – 234 D9h: Decimal Hunk! – 235 D9i: Decimal Hunk! – 236 D10i: Short Division – 244 D11g1: Chunking – 253 D11g2: Chunking – 254 D12: Long Division – 255 D13: Long Division – 256 D13j: Long Division – 257 D14: Long Division – 258
VOCABULARY					
Multiplication Multiply Multiplied by Multiple Division Dividing	Multiplication Multiply Multiplied by Multiple Groups of Times	Multiplication Multiply Multiplied by Multiple Groups of Times	Multiplication Multiply Multiplied by Multiple, factor Groups of Times	Multiplication Multiply Multiplied by Multiple, factor Groups of Times	Multiplication Multiply Multiplied by Multiple, factor Groups of Times

Grouping Sharing Doubling Halving Array Number patterns	Once, twice, three times … ten times Repeated addition Division Dividing, divide, divided by, divided into Grouping Sharing, share, share equally Left, left over One each, two each, three each … ten each Group in pairs, threes … tens Equal groups of Doubling Halving Array Row, column Number patterns Multiplication table Multiplication fact, division fact	product Once, twice, three times … ten times Repeated addition Division Dividing, divide, divided by, divided into Left, left over, remainder Grouping Sharing, share, share equally One each, two each, three each … ten each Group in pairs, threes … tens Equal groups of Doubling Halving Array Row, column Number patterns Multiplication table Multiplication fact, division fact	product Once, twice, three times … ten times Repeated addition Division Dividing, divide, divided by, divided into Left, left over, remainder Grouping Sharing, share, share equally One each, two each, three each … ten each Group in pairs, threes … tens Equal groups of Doubling Halving Array Row, column Number patterns Multiplication table Multiplication fact, division fact Inverse Square, squared Cube, cubed	Product Once, twice, three times … ten times Repeated addition Division Dividing, divide, divided by, divided into Left, left over, remainder Grouping Sharing, share, share equally One each, two each, three each … ten each Group in pairs, threes … tens Equal groups of Doubling Halving Array Row, column Number patterns Multiplication table Multiplication fact, division fact Inverse Square, squared Cube, cubed	Product Once, twice, three times … ten times Repeated addition Division Dividing, divide, divided by, divided into Left, left over, remainder Grouping Sharing, share, share equally One each, two each, three each … ten each Group in pairs, threes … tens Equal groups of Doubling Halving Array Row, column Number patterns Multiplication table Multiplication fact, division fact Inverse Square, squared Cube, cubed