# Town End Junior School

# National Curriculum 2014 and Ready to Progress Criteria

## Strand: Calculation: Addition and Subtraction

Objectives in black are National Curriculum statutory requirements; objectives in blue are non-statutory ready to progress criteria.

| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| **Addition & Subtraction**<br><br>• Pupils should be taught to: read, write & interpret mathematical statements involving addition (+), subtraction (-) & equals (=) signs.<br><br>**1AS–2** Read, write and interpret equations containing addition (+), subtraction (-) and equals (+) symbols, and relate additive expressions and equations to real-life contexts.<br><br>• Represent and use number bonds and related subtraction facts within 20.<br><br>• Add and subtract one-digit & two-digit numbers to 20, including zero.<br><br>**1NF–1** Develop fluency in addition and subtraction facts within 10.<br><br>• Solve one-step problems that involve addition and subtraction, using concrete objects & pictorial representations, and missing number problems such as 7 = [ ] - 9.<br><br>**1AS–1** Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers. | **Addition & Subtraction**<br><br>• Solve problems with addition & subtraction:<br>-using concrete objects and pictorial representations, including those involving numbers, quantities and measures<br>-applying their increasing knowledge of mental and written methods.<br><br>• Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.<br><br>**2NF–1** Secure fluency in addition and subtraction facts within 10, through continued practice.<br><br>**2AS–1** Add and subtract across 10, for example:<br>8 + 5 = 13<br>13 – 5 = 8.<br><br>• Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:<br>-a two-digit number and ones<br>-a two-digit number and tens<br>-two two-digit numbers<br>-adding three one-digit numbers.<br><br>**2AS–3** Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two-digit number. | **Addition & Subtraction**<br><br>• Add and subtract numbers mentally, including:<br>-a three-digit number and ones<br>-a three-digit number and tens<br>-a three-digit number and hundreds.<br><br>**3NF–1** Secure fluency in addition and subtraction facts that bridge 10, through continued practice.<br><br>**3AS–1** Calculate complements to 100, for example:<br>46 + ? = 100.<br><br>• Add & subtract numbers with up to three digits, using formal written methods of columnar + and –.<br><br>**3AS–2** Add and subtract up to three-digit numbers using columnar methods.<br><br>• Estimate answers to calculations; use inverses to check.<br><br>• Solve problems, including missing number problems, using number facts, place value & more complex + & - .<br><br>**3AS–3** Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part –part – whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction. | **Addition & Subtraction**<br><br>• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.<br><br>• Estimate and use inverse operations to check answers to a calculation.<br><br>• Solve + and - two-step problems in contexts, deciding which operations and methods to use & why. | **Addition & Subtraction**<br><br>• Add and subtract whole numbers with more than 4 digits, including using formal methods (columnar + & -).<br><br>• Add and subtract numbers mentally with increasingly large numbers.<br><br>• Use rounding to check answers and determine, in the context of a problem, levels of accuracy.<br><br>• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use & why. | **Addition, Subtraction, Multiplication & Division**<br><br>• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.<br><br>**6AS/MD–1** Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).<br><br>• 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.<br><br>• Perform mental calculations, including with mixed operations and large numbers.<br><br>• Identify common factors, common multiples and prime numbers.<br><br>• Use their knowledge of the order of operations to carry out calculations involving the four operations.<br><br>• Solve addition and subtraction multi -step problems in contexts, deciding which operations and methods to use and why. |

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| | **2 AS–4** Add and subtract within 100 by applying related one -digit addition and subtraction facts: add and subtract any 2 two -digit numbers.<br><br>• Show that addition of two numbers can be done in any order and subtraction of one number from another cannot.<br><br>• Recognise and use the inverse relationship between addition & subtraction and use this to check calculations and missing number problems.<br><br>**2AS–2** Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more …?". | | | | • Solve problems involving addition, subtraction, multiplication and division.<br><br>**6AS/MD–1** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place - value understanding.<br><br>• Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. |

# Strand: Calculation: Multiplication and Division; Algebra (Y6); Ratio and Proportion (Y6).

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| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| **Multiplication & Division**<br><br>• Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations. | **Multiplication & Division**<br><br>• Recall & use multiplication & division facts for 2, 5 & 10 tables, including recognising odd and even numbers.<br><br>**2MD–1** Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.<br><br>• Calculate mathematical statements for multiplication and division within the multiplication tables; write them using multiplication (x), division (÷) & equals (=) signs.<br><br>• Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.<br><br>• Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.<br><br>**2MD–2** Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division). | **Multiplication & Division**<br><br>• Recall & use x and ÷ facts for the 3, 4 and 8 tables.<br><br>**3NF–2** Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number.<br><br>• Write and calculate statements for x and ÷ using tables they know, including for TU x U using mental and progressing to formal written methods.<br><br>**3NF–3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10), for example:<br>80 + 60 = 140<br>140 – 60 = 80<br><br>30 x 4 = 120<br>120 ÷ 4 = 30.<br><br>• Solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which ***n*** objects are connected to ***m*** objects.<br><br>**3MD–1** Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division. | **Multiplication & Division**<br><br>• Recall multiplication and division facts up to 12 x 12.<br><br>**4NF–1** Recall multiplication and division facts up to, and recognise products in multiplication tables as multiples of the corresponding number.<br><br>• 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.<br><br>• Recognise and use factor pairs and commutativity in mental calculations.<br><br>**4MD–2** Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.<br><br>• Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.<br><br>• 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.<br><br>**4MD–3** Understand and apply the distributive property of multiplication. | **Multiplication & Division**<br><br>**5NF–1** Secure fluency in multiplication table facts, and corresponding division facts, through continued practice.<br><br>• Identify multiples & factors; find all factor pairs of a number & common factors of two numbers.<br><br>**5MD–2** Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.<br><br>• Solve problems involving x and ÷ where larger numbers are used by decomposing them into their factors.<br><br>• Know & use the vocabulary of prime numbers, prime factors & composite numbers.<br><br>• Find whether a number up to 100 is prime; recall primes up to 19.<br><br>• Multiply numbers up to 4 digits by one or two-digits using a formal methods, including long multiplication for two-digit numbers.<br><br>**5MD–3** Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.<br><br>• Multiply & divide numbers mentally draw on known facts. | **Algebra**<br><br>• Express missing number problems algebraically.<br><br>• use simple formulae expressed in words.<br><br>• Generate and describe linear number sequences.<br><br>• Find pairs of numbers that satisfy number sentences involving two unknowns<br><br>**6AS/MD–4** Solve problems with 2 unknowns.<br><br>• Enumerate all possibilities of combinations of two variables.<br><br>**Ratio and Proportion**<br><br>• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.<br><br>**6AS/MD–3** Solve problems involving ratio relationships.<br><br>• Solve problems involving the calculation of percentages (e.g. of measures) such as 15% of 360 and the use of percentages for comparison.<br><br>• Solve problems involving similar shapes where the scale factor is known or can be found. |

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| | | | **4NF–2** Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, for example: 74 ÷ 9 = 8 r 2 and interpret remainders appropriately according to the context.<br><br>**4NF–3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100), for example:<br>8 + 6 = 14 and 14 – 6 = 8<br>So<br>800 + 600 = 1,400<br>1,400 – 600 = 800<br><br>3 x 4 = 12 and 12 ÷ 4 = 3<br>So<br>300 x 4 = 1,200<br>1,200 ÷ 4 = 300.<br><br>**4MD–1** Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. | • Divide numbers up to 4 digits by a one-digit number using formal written method of short division; interpret remainders. appropriately for the context.<br><br>**5MD–4** Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.<br><br>• Multiply and divide whole numbers and those involving decimals by 10, 100 & 1000.<br><br>**5MD–1** Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.<br><br>• Recognise and use square numbers & cube numbers and the notation for squared $^2$ and cubed $^3$.<br><br>• Solve problems involving all 4 rules & a combination of these, including understanding meaning of = sign.<br><br>• Solve problems involving x and ÷ including scaling by simple fractions & problems involving simple rates.<br><br>**5NF–2** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example: 8 + 6 = 14<br>0.8 + 0.6 = 1.4<br>0.08 + 0.06 = 0.14<br><br>3 x 4 = 12<br>0.3 x 4 = 1.2<br>0.03 x 4 = 0.12 | |