

**ST. TERESA'S SCHOOL**



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**Calculation Policy**

**Year Five**

# Addition - Year Five

## Key Skills

- Add increasingly large numbers mentally using an expanding range of strategies.
- Use rounding to check answers and make estimates.
- Understand the place value of tenths and hundredths.
- Solve multi step problems in different contexts, deciding which operations and methods to use and explaining why.
- Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.
- Round any number to 1 million to the nearest 10, 100, 1000, 10 000 or 100 000.
- Add numbers with more than 4 digits using column addition.
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.
- Interpret negative numbers, count forwards and backwards with positive and negative whole numbers.

## Focus: Adding with more than 4 digits.

In Year 5 children will use the column method to add decimal numbers in the context of money and measures. It is important that children have place value skills beyond 4 digits here and fully understand what a decimal number represents.

$$\begin{array}{r} \pounds 23.59 \\ + \pounds 7.55 \\ \hline \pounds 31.14 \\ \hline 111 \end{array}$$

The decimal point needs to be lined up just like all of the other place value columns and must be remembered in the answer column. It is important children understand why this is and get into this habit very quickly.

$$\begin{array}{r} 23481 \\ + 1362 \\ \hline 24843 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 19.01 \\ 3.65 \\ + 0.70 \\ \hline 23.36 \\ \hline \end{array}$$

Children need to start using the column method to add more than two values, still considering place value very carefully.

Children should be working with numbers greater than 4 digits including numbers in the ten thousands and hundred thousands.

### Remember!

- 1) It is important that children say 6 tenths add 7 tenths so they understand that they are adding part of a number not a whole number.
- 2) Empty places should be filled with a zero to show the value of that place.

## Key Vocabulary

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, numberline, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, *decimal place*, *decimal point*, *tenths*, *hundredths*, *thousandths*.

# Subtraction - Year Five

## Key Skills

- Subtract mentally with increasingly large numbers.
- Use rounding and estimation to check answers to calculations.
- Solve addition and subtraction multi step problems, deciding which operations to use and why.
- Read, write, order and compare numbers to at least 1 million and understand the value of each digit.
- Count forwards or backwards in steps of powers of 10 up to 1 million.
- Understand negative numbers in context and count forwards and backwards with positive and negative whole numbers, including through 0.
- Round any number up to 1 million to the nearest 10, 100, 1000, 10 000 and 100 000.
- Subtract whole numbers with more than 4 digits, including using formal written methods.

## Focus: Subtracting with numbers beyond 4 digits including decimals

Children in Year 5 will continue to use the compact column method of subtraction to solve problems including those where exchanging is required. They will subtract larger integers and begin to subtract decimal amounts.

$$\begin{array}{r} \cancel{2} \cancel{8} \cancel{1} \cancel{0} \cancel{8} \cancel{6} \\ - \quad 2128 \\ \hline 28,928 \end{array}$$

Children will come across problems where exchanging will need to take place several times to complete the problem.

Where there is a space in a column it is important that children add a zero so they understand the value and know what to subtract in that column.

Once confident with large integers, children will now be ready to move onto decimal numbers including lots in the context of measures and money. Just like addition, it is important that the children line up the decimal point and understand why they are doing this.

$$\begin{array}{r} \cancel{6} \cancel{7} \cancel{9} \cancel{6} \cancel{8} \\ - \quad 372.5 \\ \hline 6796.5 \end{array}$$

## Key Vocabulary

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, *tenths*, *hundredths*, *decimal place*, *decimal*.

# Multiplication - Year Five

## Key Skills

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers, using secure x table facts to 12 x 12.
- Solve problems where larger numbers are decomposed into their factors.
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- 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 and divide integers and decimals by 10,100 and 1000.
- Recognise and use square and cube numbers and their notation.
- Solve problems that have different combinations of operations, picking the most useful methods.

## Focus: Multiplying up to 4 digits by 1 or 2 digits

In Year 5 children will continue to use short multiplication to solve increasingly richer problems that involve multiplying by 1 digit. They will then move on to long multiplication for problems that involve multiplying by 2 digits. Approximation will play an important part, with children making approximations before using long multiplication to help check their answer is correct.

$$\begin{array}{r} 3652 \\ \times \quad 8 \\ \hline 29216 \\ 54 \end{array}$$

$$\begin{array}{r} 1234 \\ \times \quad 16 \\ \hline 7404 \\ 12340 \\ \hline 19744 \end{array}$$

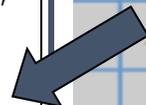
Children will use short multiplication in a range of increasingly challenging problems. Solving using the grid method and then comparing to the short multiplication method will help cement the children's understanding of the short multiplication method.

	10	8
10	100	80
3	30	24



When multiplying by more than 1 digit, children need to use long multiplication. Like with short multiplication, they will solve the problem using the grid method first and then make comparisons until their understanding is secure. In the example below the top row shows  $18 \times 3$  and the bottom shows  $18 \times 10$ . The final row shows the total of both calculations.

Once long multiplication methods are secure, children are ready to move on to more challenging problems which require greater levels of mental calculation. The problem to the right shows  $1234 \times 6$  on the top line,  $1234 \times 10$  on the bottom line and the total of both calculations on the final row.



$$\begin{array}{r} 1234 \\ \times \quad 16 \\ \hline 7404 \\ 12340 \\ \hline 19744 \end{array}$$

## Key Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, inverse, *square, factor, integer, decimal, short/long multiplication, carry.*

# Division - Year Five

## Key Skills

- Multiply and divide numbers mentally, using known facts.
- Identify multiples and factors, including all factor pairs of a number and common factors between 2 numbers.
- Solve  $\times$  and  $\div$  problems where larger numbers are decomposed into their factors.
- Multiply and divide whole numbers and decimals by 10, 100 and 1000.
- Use vocabulary of prime numbers, prime factors and composite numbers.
- Work out whether a number up to 100 is prime and know all prime numbers to 30.
- 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
- Use and understand multiplication and division as inverses.
- Recognise and use square numbers and cube numbers, and the notation for squared ( $^2$ ) and cubed ( $^3$ )
- Present division with remainders answers differently, showing the remainder as a fraction, decimal or whole number by rounding.
- Solve problems with a combination of all four operations including fraction scaling problems and problems involving simple rates.

## Focus: Extending use of short multiplication to 4 digits and remainders

Children in Year 5 will use short division to solve problems up to 4 digits long. For the first time they will use short division to solve problems that have a remainder in the final answer.

	0	6	6	3	r	5
8	)	5	3	0	9	

In Year 5 children will begin to solve division problems where a number up to 4 digits is divided by a single digit number including answers with remainders. These division problems need to be contextual so the children learn how to express the remainder- as a number, a fraction, a decimals, rounded up or rounded down.

## Key Vocabulary

Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, *quotient*, *prime number*, *prime factors*, *composite number (non-prime)*

# Year Five Statutory Requirements

<p style="text-align: center;"><b>Number - Place Value</b></p>	<p style="text-align: center;"><b>Number – Addition and Subtraction</b></p>
<ul style="list-style-type: none"> <li>• Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.</li> <li>• Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.</li> <li>• Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.</li> <li>• Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.</li> <li>• Solve number problems and practical problems that involve all of the above.</li> <li>• Read Roman numerals to 1000 (M); recognise years written in Roman no.'s.</li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).</li> <li>• Add and subtract numbers mentally with increasingly large numbers.</li> <li>• Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</li> <li>• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>
<p style="text-align: center;"><b>Number – Fractions</b></p>	<p style="text-align: center;"><b>Number – Multiplication &amp; Division</b></p>
<ul style="list-style-type: none"> <li>• Compare and order fractions whose denominators are the same multiple.</li> <li>• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.</li> <li>• Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements as a mixed number.</li> <li>• Add and subtract fractions with the same denominator and denominators that are multiples of the same number.</li> <li>• Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.</li> <li>• Read and write decimal numbers as fractions.</li> <li>• Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</li> <li>• Round decimals with two decimal places to the nearest whole number and to one decimal place.</li> <li>• Read, write, order and compare numbers with up to three decimal places.</li> <li>• Solve problems involving number up to three decimal places.</li> <li>• Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.</li> <li>• Solve problems which require knowing percentage and decimal equivalents.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</li> <li>• Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.</li> <li>• Establish whether a number up to 100 is prime; recall prime no. to 19.</li> <li>• Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit no.'s.</li> <li>• Multiply and divide numbers mentally drawing upon known facts.</li> <li>• Divide numbers up to 4 digits by one-digit, using formal written methods of short division; interpret remainders appropriate to the context.</li> <li>• Multiply and divide whole numbers and decimals by 10, 100 and 1000.</li> <li>• Recognise and use square numbers and cube numbers, and their notation.</li> <li>• Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.</li> <li>• Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the equals sign.</li> <li>• Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</li> </ul>

<p style="text-align: center;"><b>Geometry – Property of Shape</b></p>	<p style="text-align: center;"><b>Geometry – Position &amp; Direction</b></p>
<ul style="list-style-type: none"> <li>• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.</li> <li>• Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.</li> <li>• Draw given angles, and measure them in degrees (o)</li> <li>• Identify: <ul style="list-style-type: none"> <li>• angles at a point and one whole turn (total 360)</li> <li>• angles at a point on a straight line and 21 a turn (total 180)</li> <li>• other multiples of 90.</li> </ul> </li> <li>• Use the properties of rectangles to deduce related facts and find missing lengths and angles.</li> <li>• Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.</li> </ul>
<p style="text-align: center;"><b>Measures</b></p>	<p style="text-align: center;"><b>Statistics</b></p>
<ul style="list-style-type: none"> <li>• Convert between different units of metric measure: kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre.</li> <li>• Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</li> <li>• Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.</li> <li>• Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm<sup>2</sup>) and square metres (m<sup>2</sup>) and estimate the area of irregular shapes.</li> <li>• Estimate volume: use 1 cm<sup>3</sup> blocks to build cuboids (including cubes); and capacity (for example, using water)</li> <li>• Solve problems involving converting between units of time.</li> <li>• Use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve comparison, sum and difference problems using information presented in a line graph.</li> <li>• Complete, read and interpret information in tables, including timetables.</li> </ul>