

Mathematics Syllabus – Year 5

5.1 NUMBER AND ALGEBRA

Learning Outcome	Notes
<p>* Properties of numbers and number sequences</p>	
<ul style="list-style-type: none"> Recognise and extend number sequences formed by counting from any number in steps of constant size. 	Exclude negative numbers.
<ul style="list-style-type: none"> Recognise odd and even numbers up to 1000, and some of their properties, including the outcome of sums or differences of pairs of odd/even numbers. 	
<ul style="list-style-type: none"> Make general statements about odd or even numbers, including the outcome of sums and differences. 	
<ul style="list-style-type: none"> Recognise multiples of 2, 3, 4, 5 and 10, up to the tenth multiple. 	
<ul style="list-style-type: none"> Recognise multiples of 6, 7, 8 and 9, up to the tenth multiple. 	
<ul style="list-style-type: none"> Know and apply tests of divisibility by 2, 4, 5, 10 or 100. 	
<ul style="list-style-type: none"> Know squares of numbers to at least 10×10. 	
<ul style="list-style-type: none"> Find all the pairs of factors of any number up to 100. 	
<p>* Place-value, ordering and rounding (whole numbers)</p>	
<ul style="list-style-type: none"> Read and write whole numbers in figures and words, and know what each digit represents. 	<p>Children understand that, for multiplication, the digits move one place to the left; for division, to the right. It is not the decimal point that moves.</p> <p>e.g. $35.6 \times 10 = 356$ $356 \div 10 = 35.6$</p>
<ul style="list-style-type: none"> Multiply or divide any integer up to 1000 by 10 (whole-number answers), and understand the effect. Begin to multiply by 100. 	
<p>5.1.1 Multiply and divide any integer up to 10 000 by 10 or 100 and understand the effect.</p>	
<ul style="list-style-type: none"> Use the vocabulary of comparing and ordering numbers. Give one or more numbers lying between two given numbers. 	Include symbols such as $<$, $>$, $=$.

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5.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
<p>* Place-value, ordering and rounding (whole numbers) (contd)</p>	
<ul style="list-style-type: none"> Read and write the vocabulary of estimation and approximation. Make and justify estimates up to about 250, and estimate a proportion. 	
<p>5.1.2 Round any positive integer less than 1000 to the nearest 10 or 100.</p>	
<ul style="list-style-type: none"> Use the vocabulary of estimation and approximation. Make and justify estimates of large numbers, and estimate simple proportions. 	such as one third, seven tenths.
<ul style="list-style-type: none"> Round any integer up to 10 000 to the nearest 10, 100 or 1000. 	
<p>5.1.3 Order a given set of positive integers.</p>	
<p>* Fractions and decimals</p>	
<p>Use fraction notation.</p> <p>5.1.4 Recognise simple fractions that are several parts of a whole and mixed numbers;</p>	such as $\frac{2}{3}$, or $\frac{5}{8}$. such as $5\frac{3}{4}$.
<p>Recognise the equivalence of simple fractions.</p>	e.g. fractions equivalent to $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{3}{4}$.
<ul style="list-style-type: none"> Identify two simple fractions with a total of 1. 	e.g. $\frac{3}{10}$ and $\frac{7}{10}$
<ul style="list-style-type: none"> Use fraction notation, including mixed numbers, and the vocabulary ‘numerator’ and ‘denominator’. 	
<ul style="list-style-type: none"> Change an improper fraction to a mixed number. 	e.g. change $\frac{13}{10}$ to $1\frac{3}{10}$.
<ul style="list-style-type: none"> Recognise when two simple fractions are equivalent including relating hundredths to tenths. 	
<ul style="list-style-type: none"> Order simple fractions. 	e.g. decide whether fractions such as $\frac{3}{8}$ or $\frac{7}{10}$ are greater or less than one half.

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5.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Fractions and decimals (contd)	
<ul style="list-style-type: none"> Order a set of fractions, and position them on a number line. 	such as 2 , $2\frac{3}{4}$, $1\frac{3}{4}$, $2\frac{1}{2}$, $1\frac{1}{2}$.
<ul style="list-style-type: none"> Begin to relate fractions to division and find simple fractions of numbers or quantities. Find fractions. 	such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$... such as $\frac{2}{3}$, $\frac{3}{4}$, $\frac{3}{5}$, $\frac{7}{10}$... of shapes.
<ul style="list-style-type: none"> Relate fractions to division. 	
<ul style="list-style-type: none"> Use division to find simple fractions, including tenths and hundredths, of numbers and quantities. 	e.g. $\frac{3}{4}$ of 12, $\frac{3}{10}$ of 50, $\frac{3}{100}$ of €
<ul style="list-style-type: none"> Begin to use ideas of simple proportion. 	
<ul style="list-style-type: none"> Solve simple problems using ideas of simple proportion. 	
<ul style="list-style-type: none"> Understand decimal notation and place value for tenths and hundredths, and use it in context. 	e.g. order amounts of money; convert a sum of money such as €3.25 to cent, or a length of 125 cm to metres; round a sum of money to the nearest euro.
5.1.5 Use decimal notation for tenths and hundredths.	
<ul style="list-style-type: none"> Know what each digit represents in a number with up to two decimal places. 	
<ul style="list-style-type: none"> Order a set of numbers or measurements with the same number of decimal places. 	
5.1.6 Round a number with one or two decimal places to the nearest integer.	
5.1.7 Relate fractions to division and to their decimal representations.	that is, recognise the equivalence between the decimal and fraction forms of one half, one quarter, three quarters ... and tenths and hundredths. e.g. $\frac{7}{10} = 0.7$, $\frac{27}{100} = 0.27$
<ul style="list-style-type: none"> Recognise the equivalence between the decimal and fraction forms of one half and one quarter, and tenths. 	such as 0.3

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5.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Understanding addition and subtraction	
<ul style="list-style-type: none"> Consolidate understanding of relationship between + and –. Understand the principles (not the names) of the commutative and associative laws as they apply or not to addition and subtraction. 	
* Rapid recall of addition and subtraction facts	
<ul style="list-style-type: none"> Derive quickly: decimals that total 1 ... or 10; all 2-digit pairs that total 100; all pairs of multiples of 50 with a total of 1000. 	e.g. $0.2 + 0.8$... or $6.2 + 3.8$ e.g. $43 + 57$ e.g. $350 + 650$
* Mental calculation strategies (+ and –)	
<ul style="list-style-type: none"> Find differences mentally by counting up through the next multiple of 10, 100, or 1000. 	
<ul style="list-style-type: none"> Partition into H, T and U, adding or subtracting the most significant digits first. 	
<ul style="list-style-type: none"> Identify near doubles. 	such as $1.5 + 1.6$.
<ul style="list-style-type: none"> Develop further the relationship between addition and subtraction. 	
<ul style="list-style-type: none"> Add or subtract the nearest multiple of 10 or 100, then adjust. 	
<ul style="list-style-type: none"> Add several numbers. 	e.g. four or five single digits; or multiples of 10 such as $40 + 50 + 80$.
<ul style="list-style-type: none"> Use known number facts and place-value for mental addition and subtraction. 	
* Pencil and paper procedures (+ and –)	
<ul style="list-style-type: none"> Use informal pencil and paper methods to support, record or explain additions and subtractions. 	

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5.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Pencil and paper procedures (+ and –) (contd)	
5.1.8 Develop and refine written methods for: Column addition and subtraction of two whole numbers less than 1000, and addition of more than two such numbers. Money calculations.	e.g. €7.85 ± €3.49
5.1.9 Extend written methods to column addition/subtraction of two integers less than 10 000.	
<ul style="list-style-type: none"> Extend written methods to addition of more than two integers less than 10 000. 	
<ul style="list-style-type: none"> Extend written methods to addition or subtraction of a pair of decimal fractions, both with one or both with two decimal places. 	e.g. €29.78 + €3.34
* Understanding multiplication and division	
<ul style="list-style-type: none"> Understand the effect of and the relationship between the four operations, and the principles (not the names) of the arithmetic laws as they apply to multiplication. 	e.g. $4 \times 46 = 4 \times 40 + 4 \times 6$ $= (4 \times 40) + (4 \times 6)$
<ul style="list-style-type: none"> Begin to use brackets. 	
<ul style="list-style-type: none"> Begin to express a quotient as a fraction, or as a decimal when dividing a whole number by 2, 4, 5 or 10, or when dividing €c. 	
5.1.10 Find remainders after division. Divide a whole number of euro by 2, 4, 5 or 10 to give €c. Round up or down after division, depending on the context.	
* Rapid recall of multiplication and division facts	
<ul style="list-style-type: none"> Begin to know: Multiplication facts for 6, 7, 8 and 9 times-tables. 	
5.1.11 Know by heart all multiplication facts up to 10 × 10.	
<ul style="list-style-type: none"> Derive quickly or continue to derive quickly: division facts corresponding to tables up to 10 × 10; 	

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5.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Rapid recall of multiplication and division facts (contd)	
doubles of all whole numbers 1 to 100; doubles of multiples of 10 to 500;	e.g. 460×2
doubles of multiples of 10 to 1000; doubles of multiples of 100 to 5000;	e.g. 3400×2
doubles of multiples of 100 to 10 000; and the corresponding halves.	e.g. $74 \div 2$, $\frac{1}{2}$ of 420, half of 3800.
* Mental calculation strategies (\times and \div)	
<ul style="list-style-type: none"> Use halving, starting from known facts 	e.g. find quarters by halving halves.
<ul style="list-style-type: none"> Use doubling or halving, starting from known facts. 	e.g. double/halve any 2-digit number by doubling/halving the tens first; double one number and halve the other; to multiply by 25, multiply by 100 then divide by 4; find sixths by halving thirds.
<ul style="list-style-type: none"> Use factors. 	
<ul style="list-style-type: none"> Use closely related facts 	e.g. to multiply by 9 or 11, multiply by 10 and adjust; develop the $\times 6$ table from the $\times 4$ and $\times 2$ tables.
<ul style="list-style-type: none"> Use closely related facts: 	e.g. Multiply by 19 or 21 by multiplying by 20 and adjusting.
<ul style="list-style-type: none"> Partition and use the distributive law. 	e.g. $23 \times 4 = (20 \times 4) + (3 \times 4)$
<ul style="list-style-type: none"> Use the relationship between multiplication and division. 	
<ul style="list-style-type: none"> Use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers). 	
<ul style="list-style-type: none"> Use known number facts and place-value to multiply and divide mentally. 	
* Pencil and paper procedures (\times and \div)	
<ul style="list-style-type: none"> Approximate first. Use informal pencil and paper methods to support, record or explain multiplications and divisions. 	

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5.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Pencil and paper procedures (\times and \div) (contd)	
<ul style="list-style-type: none"> Develop and refine written methods for $TU \times U$, $TU \div U$. 	
5.1.12 Extend written methods to short multiplication of HTU by U.	
5.1.13 Extend written methods to long multiplication of TU by TU.	
<ul style="list-style-type: none"> Extend written methods to short multiplication of simple decimals with one decimal place. 	
<ul style="list-style-type: none"> Extend written methods to short division of HTU by U (with integer remainder). 	
* Checking results of calculations	
<ul style="list-style-type: none"> Check with the inverse operation. 	
<ul style="list-style-type: none"> Check with an equivalent calculation. 	
<ul style="list-style-type: none"> Estimate and check by approximating (round to nearest 10 or 100). 	
<ul style="list-style-type: none"> Use knowledge of sums or differences of odd/even numbers. 	

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5.2 MEASURES, SHAPE AND SPACE

Learning Outcome	Notes
* Measures	
<ul style="list-style-type: none"> Use, read and write standard metric units, including their abbreviations. 	km, m, cm, kg, g, l, ml
5.2.1 Know and use the relationships between familiar units of length, mass and capacity.	
<ul style="list-style-type: none"> Know the equivalent of one half, one quarter, three quarters and one tenth of 1km, 1m, 1kg, 1 litre in m, cm, g, ml. Convert up to 1000 centimetres to metres, and vice versa. 	
<ul style="list-style-type: none"> Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. Record estimates and readings from scales to a suitable degree of accuracy. 	
<ul style="list-style-type: none"> Measure and calculate the perimeter and area of rectangles and other simple shapes, using counting methods and standard units (cm, cm²). 	
<ul style="list-style-type: none"> Use, read and write the vocabulary related to time. 	
<ul style="list-style-type: none"> Estimate/Check times using seconds, minutes, hours. 	
<ul style="list-style-type: none"> Read the time from an analogue clock to the nearest minute, and from a 12-hour digital clock. 	
<ul style="list-style-type: none"> Use am and pm and the notation 9:53. 	
<ul style="list-style-type: none"> Read simple timetables and use this year's calendar. 	
* Shape and space	
5.2.2 Classify polygons using criteria.	
<ul style="list-style-type: none"> Describe and visualise 3-D and 2-D shapes. 	such as symmetry properties.
<ul style="list-style-type: none"> Recognise equilateral and isosceles triangles. 	
<ul style="list-style-type: none"> Make shapes. 	e.g. by paper folding or using pinboard, and discuss properties such as lines of symmetry.

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5.2 MEASURES, SHAPE AND SPACE (contd)

Learning Outcome	Notes
* Shape and space (contd)	
<ul style="list-style-type: none">Visualise 3-D shapes from 2-D drawings and identify simple nets of solid shapes.	e.g. cube, cuboid, pyramid ... excluding prisms.
<ul style="list-style-type: none">Sketch the reflection of a simple shape in a mirror line.	
<ul style="list-style-type: none">Recognise simple examples of horizontal and vertical lines.	
<ul style="list-style-type: none">Use the eight compass directions N, S, E, W, NE, NW, SE, SW.	
<ul style="list-style-type: none">Make and measure clockwise and anti-clockwise turns.	e.g. from SW to N, or from 4 to 10 on a clock face.
<ul style="list-style-type: none">Begin to know that angles are measured in degrees and that: one whole turn is 360° or 4 right angles; a quarter turn is 90° or one right angle; half a right angle is 45°.	
<ul style="list-style-type: none">Start to order a set of angles less than 180°.	

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5.3 DATA HANDLING

Learning Outcome	Notes
* Organising and interpreting data	
5.3.1 Solve a problem by collecting, organising, representing and interpreting data in tables, charts, graphs and diagrams.	Include: pictograms - symbol representing 2, 5, 10 or 20 units; bar charts - intervals labelled in 2s, 5s, 10s or 20s.

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5.4 PROBLEM SOLVING

Learning Outcome	Notes
* Making decisions	
5.4.1 Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, pencil and paper) to solve problems.	
* Reasoning and generalising about numbers or shapes	
<ul style="list-style-type: none"> Explain methods and reasoning about numbers, orally and in writing. 	
<ul style="list-style-type: none"> Solve mathematical problems or puzzles, recognise and explain patterns and relationships, generalise and predict. Suggest extensions. 	e.g. by asking What if ...? or What could I try next?
<ul style="list-style-type: none"> Make and investigate a general statement about familiar numbers or shapes by finding examples that satisfy it. 	
<ul style="list-style-type: none"> Explain a generalised relationship (formula) in words. 	
* Problems involving ‘real life’, money or measures	
<ul style="list-style-type: none"> Use all four operations to solve word problems involving numbers and quantities based on ‘real life’, money and measures (including time), using one or more steps. 	Include converting euro to cent and metres to centimetres and vice versa.

Teachers are expected to expose their pupils to investigative work involving solutions to non-routine problems. These activities are essential to enable children to develop problem solving skills and to link together all the strands in the syllabus.

Opportunities should be sought to link mathematics to other subjects by using the Thematic Approach ... this being “*the kind of pedagogical approach that comes closest to the idea of a holistic education, and the methodology (that) should be the dominant feature of our schools.*” (NMC Creating the Future Together” p.78) Mathematics contributes to many subjects of the primary curriculum, such as *Language, Science, Art & Craft, Social Studies and Physical Education*, often in practical ways.

Computer Software available in the classroom should be used to enhance, reinforce and consolidate any learning outcomes related to each of the four strands in this syllabus, namely: Number and Algebra; Measures, Shape and Space; Data Handling; Problem Solving.