

Mathematics Syllabus – Year 6

6.1 NUMBER AND ALGEBRA

Learning Outcome	Notes
* Properties of numbers and number sequences	
<ul style="list-style-type: none"> Recognise and extend number sequences, such as the sequence of square numbers, or the sequence of triangular numbers. 	e.g. 1, 4, 9, 16, 25 ... 1, 3, 6, 10, 15 ...
<ul style="list-style-type: none"> Count on in steps of 0.1, 0.2, 0.25, 0.5... and then back. 	
<ul style="list-style-type: none"> Recognise multiples up to 10×10. Know and apply simple tests of divisibility. Find simple common multiples. 	
* Place-value, ordering and rounding	
6.1.1 Multiply and divide decimals mentally by 10 or 100, and integers by 1000, and explain the effect.	e.g. $65.3 \times 10 = 653$ $653 \div 10 = 65.3$
<ul style="list-style-type: none"> Use the vocabulary of estimation and approximation. Consolidate rounding an integer to the nearest 10, 100 or 1000. Order a set of integers less than 1 million. 	
* Fractions, decimals, percentages and proportion	
6.1.2 Reduce a fraction to its simplest form by cancelling common factors in the numerator and denominator.	e.g. $\frac{20}{36}$ Dividing the numerator and the denominator by 4 gives the simplest equivalent fraction $\frac{5}{9}$.
<ul style="list-style-type: none"> Order fractions such as $\frac{2}{3}$, $\frac{3}{4}$ and $\frac{5}{6}$ by converting them to fractions with a common denominator, and position them on a number line. 	
6.1.3 Use a fraction as an ‘operator’ to find fractions, including tenths and hundredths, of numbers or quantities.	e.g. $\frac{5}{8}$ of 32, $\frac{7}{10}$ of 40, $\frac{9}{100}$ of 400 centimetres Support through pictorial representations is recommended.

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6.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Fractions, decimals, percentages and proportion (contd)	
6.1.4 Solve simple problems involving proportion.	
<ul style="list-style-type: none"> Use decimal notation for tenths and hundredths in calculations, and tenths, hundredths and thousandths when recording measurements. 	
<ul style="list-style-type: none"> Know what each digit represents in a number with up to three decimal places. 	
<ul style="list-style-type: none"> Give a decimal fraction lying between two others. 	e.g. Children understand that 3.42 lies between 3.4 and 3.5, and by extending this idea they realise that there is an infinite number of decimal fractions between 3.4 and 3.5.
6.1.5 Order a mixed set of numbers or measurements with up to three decimal places.	
<ul style="list-style-type: none"> Round a number with two decimal places to the nearest tenth or to the nearest whole number. 	
<ul style="list-style-type: none"> Recognise the equivalence between the decimal and fraction forms of one half, one quarter, three quarters, one eighth ... and tenths, hundredths and thousandths. 	e.g. $\frac{700}{1000} = \frac{70}{100} = \frac{7}{10} = 0.7$
6.1.6 Understand percentage as the number of parts in every 100. Express simple fractions such as one half, one quarter, three quarters, and tenths and hundredths, as percentages.	e.g. know that $\frac{1}{4} = \frac{25}{100} = 25\%$.
6.1.7 Find simple percentages of small whole-number quantities.	e.g. find 10% of €500, then 20%, 40% and 80% by doubling.
* Mental calculation strategies (+ and –)	
<ul style="list-style-type: none"> Consolidate all strategies from previous year, including: find a difference by counting up; add or subtract the nearest multiple of 10, 100 or 1000, then adjust; use the relationship between addition and subtraction; add several numbers. 	

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6.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Fractions, decimals, percentages and proportion (contd)	
<ul style="list-style-type: none"> Use known number facts and place-value to consolidate mental addition/subtraction. 	e.g. $470 + 380$, $810 - 380$, $7.4 + 9.8$, $9.2 - 8.6$
* 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. 	
6.1.8 Extend written methods to column addition and subtraction of numbers involving decimals.	
* Understanding multiplication and division	
<ul style="list-style-type: none"> Understand and use the relationships between the four operations, and the principles (not the names) of the arithmetic laws. 	
<ul style="list-style-type: none"> Use brackets. 	
<ul style="list-style-type: none"> Express a quotient as a fraction or as a decimal rounded to one decimal place. Divide €c by a 2-digit number to give €c. 	
<ul style="list-style-type: none"> Round up or down after division, depending on the context. 	
* Rapid recall of multiplication and division facts	
<ul style="list-style-type: none"> Consolidate knowing by heart: Multiplication facts up to 10×10. 	
6.1.9 Derive quickly: division facts corresponding to tables up to 10×10; squares of multiples of 10 to 100; doubles of decimal numbers; doubles of multiples of 10 to 1000; doubles of multiples of 100 to 10 000; and the corresponding halves.	e.g. 60×60 ; 3.8×2 , 0.76×2 ; 670×2 ; 6500×2 ;

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6.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Mental calculation strategies (\times and \div)	
<ul style="list-style-type: none"> Use related facts and doubling or halving. 	e.g. double or halve the most significant digit first; to multiply by 25, multiply by 100 then divide by 4; double one number and halve the other; find the $\times 24$ table by doubling the $\times 6$ table twice.
<ul style="list-style-type: none"> Use factors. 	e.g. $35 \times 18 = 35 \times 6 \times 3$
<ul style="list-style-type: none"> Use closely related facts. 	e.g. multiply by 49 or 51 by multiplying by 50 and adjusting.
<ul style="list-style-type: none"> Partition. 	e.g. $87 \times 6 = (80 \times 6) + (7 \times 6)$ $3.4 \times 3 = (3 \times 3) + (0.4 \times 3)$
<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 consolidate mental multiplication and division. 	
* 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. 	
6.1.10 Extend written methods to:	
multiplication of ThHTU \times U (short multiplication);	
short multiplication of numbers involving decimals;	
long multiplication of a 3-digit by a 2-digit integer;	
short division of TU or HTU by U (mixed-number answer – repeated subtraction method);	
division of HTU by TU (repeated subtraction method);	
short division of numbers involving decimals.	e.g. $\text{€}7.60 \div 5$, $2.6\text{m} \div 4$

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6.1 NUMBER AND ALGEBRA (contd)

Learning Outcome	Notes
* Checking results of calculations	
• Check with the inverse operation.	
• Check the sum of several numbers by adding in reverse order.	
• Check with an equivalent calculation.	
• Estimate by approximating (round to nearest 10, 100 or 1000), then check result.	

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6.2 MEASURES, SHAPE AND SPACE

Learning Outcome	Notes
* Measures	
<ul style="list-style-type: none"> Use, read and write standard metric units, including their abbreviations, and relationships between them. 	km, m, cm, kg, g, l, ml, cl
<ul style="list-style-type: none"> Convert larger to smaller units. 	e.g. km to m, m to cm or mm, kg to g, l to ml.
<ul style="list-style-type: none"> Convert smaller to larger units. 	e.g. m to km, cm or mm to m, g to kg, ml to l.
<ul style="list-style-type: none"> Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. 	
<ul style="list-style-type: none"> Measure and draw lines to the nearest millimetre. 	
<ul style="list-style-type: none"> Record estimates and readings from scales to a suitable degree of accuracy. 	
6.2.1 Understand area measured in square centimetres. Understand and use the formula in words, length \times breadth for the area of a rectangle.	cm ²
<ul style="list-style-type: none"> Understand, measure and calculate perimeters of rectangles and regular polygons. 	
6.2.2 Calculate the perimeter and area of simple compound shapes that can be split into rectangles.	
<ul style="list-style-type: none"> Use units of time. 	
<ul style="list-style-type: none"> Read the time on a 24-hour digital clock and use 24-hour clock notation. 	such as 19:53. Use of Time Line to support understanding is recommended.
<ul style="list-style-type: none"> Use timetables. 	
* Shape and space	
<ul style="list-style-type: none"> Classify triangles (isosceles, equilateral, scalene), using criteria. 	such as equal sides, equal angles, lines of symmetry.
<ul style="list-style-type: none"> Classify solids according to properties. 	such as shapes of faces, number of faces, vertices and edges. Solids include the cube, cuboid, cylinder, sphere, cone, pyramid.
<ul style="list-style-type: none"> Make shapes with increasing accuracy. 	

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6.2 MEASURES, SHAPE AND SPACE (contd)

Learning Outcome	Notes
* Shape and space (contd)	
<ul style="list-style-type: none"> Identify different nets for an open cube. 	
<ul style="list-style-type: none"> Visualise 3-D shapes from 2-D drawings and identify different nets for a closed cube. 	
<ul style="list-style-type: none"> Recognise reflective symmetry in regular polygons. 	e.g. know that a square has four axes of symmetry and an equilateral triangle has three.
<ul style="list-style-type: none"> Complete symmetrical patterns with two lines of symmetry at right angles. 	
<ul style="list-style-type: none"> Recognise where a shape will be after reflection in a mirror line parallel to one side. 	i.e. sides not all parallel or perpendicular to the mirror line.
<ul style="list-style-type: none"> Recognise horizontal and vertical lines. 	
<ul style="list-style-type: none"> Understand and use angle measure in degrees. 	
<ul style="list-style-type: none"> Identify, estimate and order acute and obtuse angles. 	
6.2.3 Use a protractor (angle measurer) to measure and draw acute and obtuse angles to the nearest 5°.	
<ul style="list-style-type: none"> Check that the sum of the angles of a triangle is 180°. 	e.g. by measuring or paper folding.
<ul style="list-style-type: none"> Calculate angles in a straight line. 	
<ul style="list-style-type: none"> Calculate angles in a triangle or around a point. 	

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6.3 DATA HANDLING

Learning Outcome	Notes
* Organising and interpreting data	
<ul style="list-style-type: none"> Solve a problem by representing and interpreting data in tables, charts, graphs and diagrams. 	e.g. bar-line charts; vertical axis labelled in 2s, 5s, 10s, 20s, or 100.
6.3.1 Solve a problem by representing, extracting and interpreting data in tables, graphs and charts , including those generated by a computer.	e.g. line graphs: for distance/time; for a multiplication table, a conversion graph, a graph of pairs of numbers adding to 8.
<ul style="list-style-type: none"> Find the mean (commonly known as ‘average’) of a set of data. 	

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6.4 PROBLEM SOLVING

Learning Outcome	Notes
* Making decisions	
<ul style="list-style-type: none"> Choose and use appropriate number operations to solve problems, and appropriate ways of calculating. 	Mental, mental with jottings, written methods.
* Reasoning about numbers or shapes	
<ul style="list-style-type: none"> Explain methods and reasoning, 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. 	
* Problems involving ‘real life’, money or measures	
6.4.1 Identify and use appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities based on ‘real life’, money or measures (including time) using one or more steps.	

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.