



MATHEMATICS

Year 8 Track 2



MATHEMATICS DEPARTMENT
Learning Outcomes Framework
JUNE 2021

Strand 1

Learning Area Outcome: I understand the structure of the number system and the relationship between numbers.

Subject Focus: Number – The number system

11 I can write multiples of numbers using power notation.

e.g.

$$2 \times 2 \times 2 = 2^3$$

$$3 \times 3 \times 5 \times 5 \times 5 = 3^2 \times 5^3$$

12 I can identify common multiples of three numbers.

13 I can identify the least common multiple (LCM) of three numbers.

17 I can deduce that squares and square roots are inverses of each other.

19 I can deduce that cubes and cube roots are inverses of each other.

20 I can define what a prime number is and can identify prime numbers up to one hundred.

27 I can recognise that particular fractions have specific recurring decimal patterns, for example $\frac{1}{3} = 0.333 \dots = 0.\dot{3}$

35 I can recognise the relationship between fractions, decimals and percentages.

36 I can relate fractions which have a denominator which is a factor of 100 to integral percentages.

37 I can state one fraction lying between two given fractions.

Assistive technology, mathematical resources and activities.

41 I can use assistive technology (e.g. tablets, computers & calculators) and other learning resources (e.g. Cuisenaire rods, Unifix cubes, base 10 blocks) to learn about numbers and their properties.

42 I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 2

Learning Area Outcome: I can calculate using mental methods, pencil and paper methods, and, assistive technology methods. I can check calculations by rounding numbers and making rough approximations. I can calculate to the most appropriate level of accuracy. I can also check the reasonableness of answers.

Subject focus: Number – Numerical calculations

26	 I can work out mentally the square root of squares up to 100 and the cube root of cubes up to 125 without a calculator and use a calculator for other values.
27	I can use primes to write numbers as a product of prime factors in index form .
38	I can add, subtract, multiply and divide directed numbers.
39	I can use the BIDMAS rule with both positive and negative numbers.
40	I can round any decimal number up to three decimal places.
42	I can find fractions of a number without using assistive technology.
45	I can change mixed numbers into decimals and vice versa.
46	 I can read and interpret scales involving decimals up to 2 d.p.
48	I can add and subtract two fractions (including mixed numbers) with different denominators using equivalent fractions.
49	I can multiply and divide two fractions including mixed numbers.
50	I can work through situations involving the addition, subtraction, multiplication and division of fractions and mixed numbers up to two operations.
Percentages	
51	I can convert percentages to fractions (limited to fractions with denominators that are factors of 100) and vice versa, e.g. $60\% = \frac{3}{5}$
52	I can convert percentages to decimals that are less than 1 and up to 2 d.p. and vice versa, e.g. $34\% = 0.34$.

54	I can express a quantity as a percentage of a larger quantity.
55	I can find percentage increase and percentage decrease. E.g. A tree is 2.5 m high. After one year the height of the tree increased by 10%. Calculate the new height of the tree.
Money and Consumer Mathematics	
65	I can use published exchange rates to convert from one currency to another.
67	I can work through simple situations involving directed numbers, personal and household finance (e.g. pocket money invested in a bank account, finding out how much it will cost to prepare a meal, calculating which item is the best buy when items come in various sizes e.g. oil in one litre bottles vs oil in two litre bottles.)
Ratio and Proportion	
68	🔴 I can write ratios in their simplest form. (Including decimals) e.g. $2.5:4.5 = 5:9$
69	I can divide a quantity in a given ratio.
70	I can use ratio to solve problems.
73	I can work through simple situations that involve direct proportion using the unitary method (including price, distance, time and, mass).
Assistive technology, mathematical resources and activities.	
76	I can use assistive technology (e.g. tablets, computers and calculators) and other resources (e.g. Cuisenaire rods, Unifix cubes, base 10 blocks) appropriate to this level to calculate and to learn about numerical calculations.
77	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 3

Learning Area Outcome: I can recognise and describe patterns and relationships in various mathematical ways and can use algebraic manipulations.

Subject Focus: Algebra – Fundamentals of Algebra

1	I can recognise and extend pictorial patterns and number sequences. I can tabulate the terms corresponding to the first few stages of a pictorial pattern.
7	I can derive a formula from a situation involving two or more unknown values with positive and negative inputs.
9	I can simplify algebraic expressions by multiplying linear positive terms, e.g. $4 \times 5b$ and can multiply a single positive term over a bracket. E.g. $3(x + 4)$
14	I can evaluate linear expressions by substituting directed numbers.
15	I can change the subject of a formula that uses one or two operations.
16	I can write down and solve an equation using balancing scales and the balancing method involving unknown and whole numbers with unknown on one side only.
17	I can use and solve simple linear equations involving brackets. <i>E.g. Solve for x: $2(x + 1) = 8$</i>
18	I can work through situations leading to the solution of linear equations in one unknown. <i>E.g. mystery numbers, geometric shapes, etc.</i>
28	 I can write the coordinates of a set of points for equations of the form $y = \pm mx$, $y = \pm c$, $x = \pm c$.
29	I can construct tables of values for linear functions.
30	I can plot the graph of a linear function from a table of values.
31	I can explain what the gradient of a line represents.
37	I can use straight line graphs to find the value of one coordinate given the other.
38	I can interpret straight line graphs in real life situations. <i>E.g. conversion graphs and distance-time graphs, etc.</i>

46	● I can find the rule for a number machine involving up to two operations given a set of input and output values.
Assistive technology, mathematical resources and activities.	
52	I can use assistive technology (e.g. tablets, computers and calculators) and other resources (e.g. algebra blocks) appropriate to this level to learn about the fundamentals of algebra.
53	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 4	
Learning Area Outcome: I understand and can use forms of measurement and can make reasonable estimations.	
Subject Focus: Shape, Space & Measures – Measures	
Length, Area, Volume, Mass & Capacity	
28	I can derive and use the formula to find the area of a parallelogram.
29	I can calculate the area of compound shapes that include squares, rectangles, parallelograms and triangles.
32	I can define the surface area of a solid shape as the total amount of surface of the shape.
33	I can calculate the surface area of cubes and cuboids.
Time	
49	I can read and use the 12-hour and the 24-hour digital and analogue clock. I can convert between the 12-hour and 24-hour clock times.
50	🕒 I can read and use a time-line.
52	I can determine time intervals in days, hours and minutes.
53	I can interpret time zones

Assistive technology, mathematical resources and activities.

54	I can use assistive technology (e.g. tablets, computers and calculators) and other resources (e.g. plastic money, cardboard clocks, 2D and 3D plastic shapes, measuring instruments) appropriate to this level to learn about measures.
55	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 5

Learning Area Outcome: I can recognise and describe the properties of shapes. I can use these properties to construct shapes using appropriate mathematical instruments and to prove given geometric statements.

Subject Focus: Shape, Space & Measures – Euclidean Geometry

Lines and line segments

3	I can recognise corresponding and interior angles within sets of parallel lines and transversals
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Angles

4	I can work out the size of missing angles in situations involving corresponding and interior angles within parallel lines cut by transversals.
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Triangles

8	 I can prove that the angle sum of a triangle is 180° .
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9	 I can use the properties of triangles (equilateral, isosceles, scalene and right-angled triangles) in order to solve problems involving missing angles.
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Quadrilaterals

12	  I can classify quadrilaterals (rhombus and kite) according to the length of their sides and the size of their angles
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14	 I can use the properties of quadrilaterals (square, rectangle, parallelogram, trapezium, rhombus, and kite) to solve problems involving missing angles.
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3D Shapes	
21	 I can identify nets that are possible or not possible for a cube and a cuboid.
Circles	
22	I can identify the centre, radius, chord, diameter and circumference of a circle.
Constructions	
25	I can construct triangles given the length of one side and two angles; the length of two sides and the included angle using ruler and protractor. I can construct triangles given three sides using ruler and compasses only.
26	I can construct regular hexagons using ruler and compasses only.
Coordinate Geometry	
33	I can use simple LOGO commands such as PU, PD, FD, BK, RT, LT and REPEAT.
Assistive technology, mathematical resources and activities.	
34	I can use assistive technology (e.g. tablets, computers, dynamic computer software and LOGO) and other resources (e.g. 2D and 3D plastic shapes) appropriate to this level to learn about properties of shapes.
35	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 6	
Learning Area Outcome: I can describe position and movement of shapes in a plane.	
Subject Focus: Shape, Space & Measures – Transformation Geometry	
Reflections	
6	I can classify quadrilaterals (rhombus and kite) using reflective symmetry.
7	 I can draw and describe reflections in the x and y axis; in $y = \pm c$; $x = \pm c$; $y = \pm x$.

Rotations	
12	I can identify the order of rotational symmetry of a regular polygon.
13	I can state the order of rotational symmetry of unshaded and partly shaded 2D shapes. I can complete the shading of a given 2D shape to obtain a shape of a required order of rotational symmetry
14	 I can draw and describe rotations of a simple shape about a vertex using angles of 90° and 180° .
Translations	
16	 I can draw and describe translations using a column translation vector.
Assistive technology, mathematical resources and activities.	
21	I can use assistive technology (e.g. tablets and computers) and other resources (e.g. 2D and 3D plastic shapes) appropriate to this level to learn about transformation geometry.
22	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 7	
Learning Area Outcome: I can collect, analyse, interpret and communicate statistical information	
Subject Focus: Data Handling & Chance – Statistics	
6	I can work through a situation by extracting and interpreting data from frequency tables and bar charts.
9	I can interpret pie charts where the angle of each sector is a factor of 360.
10	I can construct simple pie charts where the angle of each sector is a factor of 360.
13	I can construct and interpret a Carroll diagram.

15	I can work through simple problems involving the mean, mode median and range; and decide when best to use each type of average using words like “outlier”.
Assistive technology, mathematical resources and activities.	
23	I can use assistive technology (e.g. tablets, computers and calculators) and other learning resources to learn about statistics.
24	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.

Strand 8	
Learning Area Outcome: I understand ideas of chance and uncertainty	
Subject Focus: Data Handling & Chance – Probability	
5	I can distinguish between experimental and theoretical probability.
9	I can deduce that the probability of all mutually exclusive events adds up to 1.
10	 I can construct a possibility space of two independent events and use it to work out the probability of an outcome.
Assistive technology, mathematical resources and activities.	
14	I can use assistive technology (e.g. tablets, computers and calculators) and other learning resources to learn about probability.
15	I can work on tasks, investigations and activities including worded problems that are related to mathematical content in this strand at this level.