

# Mathematics

## Year 8

### LEARNING BLOCK 1

#### KNOWLEDGE

##### Proportional Reasoning

##### Ratio and Scale

- Unit conversions
- Simplifying ratios
- Dividing a quantity into a ratio
- More complex ratio problems
- Compound measures; speed, density, unit pricing
- Direct and inverse proportion
- Pie charts

##### Fractions 2

- Multiply and divide proper and improper fractions
- Fractions of an amount
- Fractional increases and decreases

##### Expressions and Formulae

- Substitution
- Expanding brackets
- Factorising expressions
- Simplifying expressions
- Indices
- Solving equations
- Inequalities
- Rearranging formulae

#### SKILLS

##### Ratio and scale

- Change freely between related standard units (for example time, length, area, volume/capacity, mass).
- Use ratio notation, including reduction to simplest form.
- Divide a given quantity into two or more parts.
- Understand that a relationship between two quantities can be expressed as a ratio or a fraction.
- Use compound units such as speed, unit pricing and density to solve problems.
- Solve problems involving direct and inverse proportion, including graphical and algebraic representations.

Examples may include:

- Recipe problems
- Best buy problems
- Exchange rates

##### Fractions

- Use a variety of representations to multiply and divide fractions including proper and improper fractions.
- Understanding of the reciprocal and its uses.
- Making use of fractions and decimal conversions.

##### Expressions and Formulae

- Substitute numerical values into formulae and expressions, including scientific formulae.
- Using a variety of representations to simplify and manipulate algebraic expressions to maintain equivalence by:
  - multiplying a single term over a bracket
  - taking out common factors
  - expanding products of two or more binomials.

	<ul style="list-style-type: none"> <li>-simplifying expressions involving sums, products and powers, including the laws of indices.</li> <li>-Understand and use the vocabulary of inequalities.</li> <li>•Use a variety of methods to solve linear equations in one variable (including all forms that require rearrangement), including those with brackets and fractions.</li> </ul>
<b>ASSESSMENT</b>	<p>2 x Ratio and Proportion Assessments  1 x Statistics Assessment  1x Fractions Assessment</p> <p>2 x Expressions/Formulae Assessment</p> <p>Big Test 1 and whole class feedback</p>

## LEARNING BLOCK 2

<b>KNOWLEDGE</b>	<p>Percentages</p> <ul style="list-style-type: none"> <li>•Percentages of an amount</li> <li>•Interpret percentages as fractions and decimals</li> <li>•Express a quantity as a percentage of another</li> <li>•Calculate percentage increases and decreases</li> <li>•Reverse percentage problems</li> </ul> <p>Circles and Area</p> <ul style="list-style-type: none"> <li>•Area of circles</li> <li>•Area of compound shapes</li> <li>•Area of trapeziums</li> <li>•Circumference and perimeter of compound shapes that involve arcs</li> </ul>
<b>SKILLS</b>	<p><u>Percentages</u></p> <p>Define percentage as 'number of parts per hundred'.  Interpret diagrams as percentages and vice versa.  Find a percentage of an amount with or without a calculator.  Interpret percentages as a fraction or decimal.  Compare two quantities using percentages, and work with percentages greater than 100%.</p> <p>Percentage increase, decrease and original value problems and simple interest in financial mathematics.</p> <p><u>Circle and Area</u></p> <p>Convert between cm<sup>2</sup> and m<sup>2</sup>.  Derive and apply formulae to calculate and solve problems involving area.</p> <p>Efficient use of a calculator.</p>
<b>ASSESSMENT</b>	<p>1 x Percentages assessment  1 x Circles and Area Assessment</p> <p>Assessment point 2 with whole class feedback</p>

## LEARNING BLOCK 3

<b>KNOWLEDGE</b>	<p>Statistics</p> <ul style="list-style-type: none"><li>• Stem and leaf diagrams (including back to back stem diagrams)</li><li>• Finding averages from a frequency table</li></ul> <p>Developing Number</p> <ul style="list-style-type: none"><li>• Standard index form</li></ul> <p>Geometry 3D Shapes</p> <ul style="list-style-type: none"><li>• Properties of 3D shapes</li><li>• Volume and surface area of prisms</li><li>• Plans and elevations</li></ul>
<b>SKILLS</b>	<p>Statistics</p> <p>Construct and analyse stem and leaf diagrams, including back to back. For non-grouped data given in the form of a table, find the mean, median, mode and range.</p> <p>Developing Number</p> <p>Multiply and divide by powers of 10</p> <p>Geometry – 3D shapes</p> <p>Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D.</p> <p>Convert between <math>\text{cm}^3</math> and <math>\text{m}^3</math>.</p> <p>Know and use the fact that 1 litre = <math>1000\text{cm}^3</math>.</p> <p>Derive and apply formulae to calculate and solve problems involving volume and surface area of cuboids (including cubes) and other prisms (including cylinders). Construct and interpret plans and elevations of 3-D shapes.</p>
<b>ASSESSMENT</b>	<p>1 x Statistics Assessment 1x Developing number assessment 1 x 3D Shapes Assessment</p> <p>Big Test 3 and whole class feedback</p>