National 4 – Mathematics

Unit1 – Numeracy

In all topics

Selecting and using appropriate numerical notation and units	♦ Numerical notation should include: =, +, –, ×, ÷, /, <, >, ( ), %, decimal point ♦ Units should include: — money (pounds and pence) — time (months, weeks, days, hours, minutes, seconds) — measurement of length (millimetre, centimetre, metre, kilometre, mile); weight (gram, kilogram); volume (millilitre, litre) and temperature (Celsius or Fahrenheit)

Whole number and Decimal including Money and Reading Scales

- add and subtract whole numbers including negative numbers
- multiply whole numbers of any size, with up to four-digit whole numbers
- divide whole numbers of any size, by a single digit whole number or by 10 or 100
- round answers to the nearest significant figure or two decimal places
- use measuring instruments with straightforward scales to measure length, weight, volume and temperature
- read scales to the nearest marked, unnumbered division with a functional degree of accuracy

DST

- calculate rate: eg miles per hour or number of texts per month
- calculate distance given speed and time

Integers

- add and subtract whole numbers including negative numbers

Percentages, Fractions and Decimals

- find simple percentages and fractions of shapes and quantities, eg 50%, 10%, 20%, 25%, 33⅓%; ½, ⅓, ¼, 1/10, 1/5
- calculate percentage increase and decrease
- convert equivalences between common fractions, decimal fractions and percentages

Time

- calculate time intervals using the 12- and 24-hour clock

Ratio and Proportion

- calculate ratio and direct proportion

In all topics

Interpreting the measurements and the results of calculations to make decisions	• use appropriate checking methods, eg check sums and estimation • interpret results of measurements involving time, length, weight, volume and temperature • recognise the inter-relationship between units in the same family, eg mm↔cm, cm↔m, g↔kg, and ml↔l • use vocabulary associated with measurement to make comparisons for length, weight, volume and temperature

Unit 2– Expressions and Formulae

Algebra – simplifying and removing brackets, collecting like terms.

Simplifying an expression which has more than one variable	$3a+4b-a+6b$

Using the distributive law in an expression with a numerical common factor to produce a sum of terms	$3(4x+2)$ $5(a-2c)$

Factorising

Factorising a sum of terms with a numerical common factor	$7x+21$ $24y-9$

Substitution & Evaluation

Evaluating an expression or a formulae which has more than one variable	Evaluate linear expressions for given integer values $4w+6t-3k$

Patterns and sequences- c = 3t +4 be able to find t by substitution and c by solving an equation.

Extending a straightforward number or diagrammatic pattern and determining its formula	Straightforward sequences such as 4, 7, 10, 13,... Patterns in diagram format Evaluate the determined formula for a given value

Gradient

Calculating the gradient of a straight line from horizontal and vertical distances	Vertical distance over horizontal distance

Circumference and Area of Circles

Calculating the circumference and area of a circle	Given radius or diameter

Area/ Surface area

Calculating the area of a parallelogram, kite, trapezium	Approached as composite shapes, eg by splitting into triangles
Investigating the surface of a prism	♦ Know face, vertex, edge ♦ Draw nets ♦ Calculate surface area

Volume- prisms and cuboids

Calculating the volume of a prism	Triangular prism, cylinder, other prisms given the area of the base

Rotational Symmetry

Using rotational symmetry	With straightforward shapes

Statistics – Pie charts drawing and reading, probability, mean, frequency table, scatter graphs

Constructing a frequency table with class intervals from raw data	Using ungrouped data
Determining statistics of a data set	♦ mean ♦ median ♦ mode ♦ range
Interpreting calculated statistics	Using mean, median, mode, range to compare data sets
Representing raw data in a pie chart	Calculation of sector angles for given categories

Probability

Using probability	Calculation of probability Interpret probability in the context of risk

Unit 3- Relationships

Straight Line

Drawing and recognising a graph of a linear equation.	Draw a graph for values or chosen values of x For $y=mx+c$, know the meaning of m m and c Recognise and use $y=a$, $x=b$

Linear Equations

Solving linear equations.	$ax+b=c$ $ax+b=cx+d$ where a, b, c, d are integers

Changing the subject of a formula

Changing the subject of a formula.	Change the subject of the formulae: $G=x+a$ to x $h=\frac{v}{n}$ to n $E=3w-k$ to w

Pythagoras

Using Pythagoras' theorem	◆ given measurements ◆ given coordinates

Scale factor

Using a fractional scale factor to enlarge or reduce a shape	Non-regular rectilinear shape

Angles and angles within circles

Using parallel lines, symmetry and circle properties to calculate angles	Combination of angle properties associated with: ◆ Intersecting and parallel lines ◆ Triangles and quadrilaterals Circles: ◆ angle in a semi-circle ◆ relationship between tangent and radius

Trigonometry

Calculating a side in a right-angled triangle	Given a side and an angle
Calculating an angle in a right-angled triangle	Given two sides