

Curriculum Area: Maths Year: 7
2015/2016

Topics	Year Curriculum	How you can support learning at home, eg. Books, websites, family learning through visits.
Module 1 Number	<p><u>Term 1: Place value, ordering and rounding</u></p> <ul style="list-style-type: none"> ●● understand and use place value for decimals, measures and integers of any size order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ ●● multiply and divide integers and decimals by 10, 100, 1000, and explain the effect ●● compare and order decimals in different contexts; know that when comparing measurements the units must be the same. ●● round numbers and measures to an appropriate degree of accuracy ●● use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$ ●● use a calculator and other technologies to calculate results accurately and then interpret them appropriately ●● use standard units of mass, length, time, money and other measures, including with decimal quantities ●● appreciate the infinite nature of the sets of integers, real and rational numbers <p><u>Term 1: Fractions decimals and percentages</u></p> <ul style="list-style-type: none"> ●● express a smaller whole number as a fraction of a larger one; simplify fractions by cancelling all common factors and identify equivalent fractions; convert terminating decimals to fractions, e.g. $0.23 = \frac{23}{100}$; use diagrams to compare two or more simple ●● add and subtract simple fractions and those with common denominators; calculate simple fractions of quantities and measurements (whole-number answers); multiply a fraction by an integer ●●; calculate simple percentages and use percentages to compare simple proportions Define percentage as ‘number of parts per hundred’, interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express 1 quantity as a percentage of another, compare 2 quantities using percentages, and work with percentages greater than 100%. ●● recognise the equivalence of percentages, fractions and decimals work interchangeably with terminating decimals and their corresponding fractions (such as $\frac{7}{2}$ as 3.5 and or 0.375 and $\frac{3}{8}$) 	<p>BBC Bitesize KS3 website My maths: online lessons , online homeworks and booster packs Nrich Maths: http://nrich.maths.org/teacher-secondary</p>



- interpret fractions and percentages as operators

Term 2: Integers, powers and roots

- understand negative numbers as positions on a number line; order, add and subtract integers in context

- use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property

- recognise the first few triangular numbers; recognise the squares of numbers to at least 12×12 and the corresponding roots

use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations

Interpret and compare numbers in standard form $A \times 10^n$ $1 \leq A < 10$, where n is a positive or negative integer or 0.

Term 2: Ratio and proportion

- change freely between related standard units

- use scale factors, scale diagrams and maps express 1 quantity as a fraction of another, where the fraction is less than 1 and greater than 1

use ratio notation, including reduction to simplest form.

- divide a given quantity into 2 parts in a given part:part or part:whole ratio; express the division of a quantity into 2 parts as a ratio

understand that a multiplicative relationship between 2 quantities can be expressed as a ratio or a fraction (Multiplicative reasoning

is a big focus of new curriculum)

- relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions

- solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics

- solve problems involving direct and inverse proportion, including graphical and algebraic representations

- use compound units such as speed, unit pricing and density to solve problems

- understand the relationship between ratio and proportion; use direct proportion in simple

contexts; use ratio notation, simplify ratios and divide a quantity into two parts in a given ratio; solve



simple problems involving ratio and proportion using informal strategies

Term 3 Number Operations

- use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative
- use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals

- recognise and use relationships between operations including inverse operations

Term 3 Written & Mental Calculations

- recall number facts, including positive integer

complements to 100 and multiplication facts to 10×10 , and quickly derive associated division facts

- strengthen and extend mental methods of calculation to include decimals, fractions and percentages, accompanied where appropriate by suitable jottings; solve simple problems mentally

- make and justify estimates and approximations of

Calculations

- use efficient written methods to add and subtract whole numbers and decimals with up to two places
- multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single digit whole numbers

- carry out calculations with more than one step using brackets and the memory; use the square root and sign change keys

- enter numbers and interpret the display in different contexts (decimals, percentages, money, metric measures)

- check results by considering whether they are of the right order of magnitude and by working problems backwards

Module 2
Algebra

Term 1: Understanding letters

CGP Ks3 revision Guides and work book



- know the meanings of the words term, expression and equation
- understand that algebraic operations follow the rules of arithmetic
- use and interpret algebraic notation, including:

ab in place of $a \times b$

3y in place of $y + y + y$ and $3 \times y$

a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$

$\frac{a}{b}$

in place of $a \div b$

coefficients written as fractions rather than as decimals brackets

simplify and manipulate algebraic expressions to maintain equivalence by:

collecting like terms

multiplying a single term over a bracket

taking out common factors **“Factorising” wasn’t mentioned in 2007 POS**

Term 1: Equations and inequalities

- use algebraic methods to solve linear equations in 1 variable (including all forms that require rearrangement)
- construct and solve simple linear equations with integer coefficients (unknown on one side only) using an appropriate method (e.g. inverse operations)
- use simple formulae from mathematics and other subjects; substitute positive integers into linear expressions and formulae and, in simple cases, derive a formula

Term 2: Mapping, functions and graphs

- model situations or procedures by translating them into algebraic expressions or formulae and by using graphs
- work with coordinates in all 4 quadrants
- recognise, sketch and produce graphs of linear and quadratic functions of 1 variable with appropriate scaling, **using equations in x and y and the Cartesian plane.(expressed differently but we are already doing this)**
- interpret mathematical relationships both algebraically and graphically
- reduce a given linear equation in two variables to the standard form $y = mx + c$; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically
- use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations
- find approximate solutions to contextual problems from given graphs of a variety of functions,

available from most good book shops.



	<p>including piece-wise linear, exponential and reciprocal graphs</p> <p><u>Term 3: Sequences</u></p> <ul style="list-style-type: none"> ●● describe integer sequences; generate terms of a sequence from either a term-to-term or a position-to-term rule ●● recognise arithmetic sequences and find the nth term ●● recognise geometric sequences and appreciate other sequences that arise ●● generate sequences from patterns or practical contexts and describe the general term in simple cases 	
<p>Module 3 Shape and space</p> <p><i>Locs and bearings have been removed</i></p>	<p><u>Term 1: Angles rules and properties of shapes</u></p> <ul style="list-style-type: none"> ●● use correctly the vocabulary, notation and labelling conventions for lines, angles and shapes ●● identify parallel and perpendicular lines; know the sum of angles at a point, on a straight line and in a triangle; recognise vertically opposite angles ●● identify and use angle, side and symmetry properties of triangles and quadrilaterals; explore geometrical problems involving these properties, explaining reasoning orally, using step-by-step deduction supported by diagrams ●● use 2-D representations to visualise 3-D shapes and deduce some of their properties ●● distinguish between and estimate the size of acute, obtuse and reflex angles ●● derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures using appropriate language and technologies ●● apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles ●● understand and use the relationship between parallel lines and alternate and corresponding angles derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons ●● apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs ●● use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles ●● 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>SATs Online Practice</p> <p>Practice KS3 assessments online</p> <p>Levels 3-5 paper 1, paper 2</p> <p>Levels 4-6 paper 1, paper 2</p> <p>Levels 5-7 paper 1, paper 2</p> <p>Levels 6-8 paper 1, paper 2</p>



Term 2: Perimeter and Area

- know and use the formula for the area of a rectangle; calculate the perimeter and area of shapes made from rectangles
- calculate the surface area of cubes and cuboids
- derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia,
 - volume of cuboids (including cubes) and other prisms (including cylinders)
- calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes

Term 2: Measures

- choose and use units of measurement to measure, estimate calculate and solve problems in everyday contexts; convert one metric unit to another, e.g. grams to kilograms; read and interpret scales on a range of measuring instruments

Term 2: Coordinates and transformations

- understand and use the language and notation associated with reflections, translations and rotations
- recognise and visualise the symmetries of a 2-D shape
- transform 2-D shapes by:
 - reflecting in given mirror lines
 - rotating about a given point
 - translating
- explore these transformations and symmetries using ICT
- use conventions and notation for 2-D coordinates in all four quadrants; find coordinates of points determined by geometric information



	<p><u>Term 3: Loci and constructions</u></p> <ul style="list-style-type: none"> ●● use a ruler and protractor to: <ul style="list-style-type: none"> – measure and draw lines to the nearest millimetre and angles in geometric figures, including interpreting scale drawings, including reflex angles, to the nearest degree. – construct a triangle, given two sides and the included angle (SAS) or two angles and the included side (ASA) ●● use ICT to explore constructions ●● use ruler and protractor to construct simple nets of 3-D shapes, e.g. cuboid, regular tetrahedron, square based pyramid, triangular prism ●● derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); ●● recognise and use the perpendicular distance from a point to a line as the shortest distance to the line ●● describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric ●● use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles ●● identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids 	
<p>Module 4 Handling data</p> <p>No probability in ks2</p> <p>Data handling cycles are no longer required in KS2</p>	<p><u>Term 1: Probability</u></p> <ul style="list-style-type: none"> ●● use vocabulary and ideas of probability, drawing on experience ●● understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts; identify all the possible mutually exclusive outcomes of a single event ●● estimate probabilities by collecting data from a simple experiment and recording it in a frequency table; compare experimental and theoretical probabilities in simple contexts ●● record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale ●● understand that the probabilities of all possible outcomes sum to 1 ●● enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn 	<p>The Maths eBook of Notes and Examples is a fantastic, free, comprehensive set of revision notes and worked examples for students.</p>



diagrams

- generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities

Term 2: Processing data

- describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and **appropriate measures of central tendency** (mean, mode, median) and spread (range, consideration of outliers)
- describe simple mathematical relationships between 2 variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs

Term 3: Planning data

- suggest possible answers, given a question that can be addressed by statistical methods
- decide which data would be relevant to an enquiry and possible sources
- plan how to collect and organise small sets of data from surveys and experiments:
 - design data collection sheets or questionnaires to use in a simple survey
 - construct frequency tables for gathering discrete data, grouped where appropriate in equal class intervals
- collect small sets of data from surveys and experiments, as planned

Term 3: Representing data

- construct, on paper and using ICT, graphs and diagrams to represent data, including:
 - bar-line graphs
 - frequency diagrams for grouped discrete data



	<ul style="list-style-type: none"> – simple pie charts ●● interpret diagrams and graphs (including pie charts), and draw simple conclusions based on the shape of graphs and simple statistics for a single distribution ●● compare two simple distributions using the range and one of the mode, median or mean ●● write a short report of a statistical enquiry, including appropriate diagrams, graphs and charts, using ICT as appropriate; justify the choice of presentation 	
<p>Module 5 Using and applying Mathematics</p> <p>Working mathematically</p>	<p>Through the mathematics content, pupils should be taught to:</p> <p>Develop fluency consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots</p> <p>select and use appropriate calculation strategies to solve increasingly complex problems</p> <p>use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships</p> <p>substitute values in expressions, rearrange and simplify expressions, and solve equations</p> <p>move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]</p> <p>develop algebraic and graphical fluency, including understanding linear and simple quadratic functions</p> <p>use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.</p> <p>Reason mathematically</p> <p>extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations</p>	<p>Assessment:</p> <p>Every half term a topic based or optional test is taken.</p> <p>End of every term the year group will complete a maths project that will give the opportunity to apply the maths that they have learnt during that term.</p>



extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically

identify variables and express relations between variables algebraically and graphically

make and test conjectures about patterns and relationships; look for proofs or counterexamples

begin to reason deductively in geometry, number and algebra, including using geometrical constructions (More explicit than previous curriculum)

interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning (More explicit than previous curriculum)

Explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally. (Much more emphasis on formal throughout)

Solve problems

Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems. (Multi-step & increasingly sophisticated)

develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics

begin to model situations mathematically and express the results using a range of formal mathematical representations

select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.

