KS3
Mathematics Curriculum Maps 22/23

GEORGE SALTER ACADEMY

GM1
A2
NP9
NP8
NP7
A1
NP6
NP5
NP4
NP3
NP2
NP1
Year 7

Autumn 1

Unit NP1 - Place Value & the Number Line

1.1	writing integers and decimals in expanded form and in words
1.2	ordering positive integers and decimals, placing on a number line
1.3	ordering positive and negative numbers, placing on a number line, symmetry of the number line about 0
1.4	multiplying/dividing by positive and negative powers of 10
1.5	rounding 'to the nearest', d.p. and s.f.
1.6	sensible estimates of measure (metric) and common metric conversions
1.7	finding the midpoint of two numbers
1.8	the median of discrete data
1.9	working in different bases (e.g. binary)

Unit NP2 - Addition & Subtraction

2.1	strategies for addition and subtraction of positive integers *and* decimals, including counting up/down in different intervals (incl. decimals)
2.2	complement of a decimal (able to find 1-p, given p)
2.3	inverting addition and subtraction, additive inverse, additive identity; symmetry of subtraction (a-b=n, b-a=-n)
2.4	using the commutative and associative laws to help calculation
2.5	extending additive number sense to unknowns
2.6	continuing linear sequences
2.7	finding the perimeter of a polygon
2.8	basic angle facts (straight line, round a point, vertically opposite, in a triangle)
2.9	mean & range of a dataset
2.10	applications & problems, including money problems and using different bases

Autumn 2

Unit NP3 - Multiplication & Division

3.1	multiplication tables to 12x12
3.2	mental and written strategies for multiplication of positive integers *and* decimals, formal and informal techniques, commutativity, associativity and distributivity
3.3	multiples and LCM (by systematic listing)
3.4	division of positive integers *and* decimals, writing division as a fraction, formal and informal techniques, incl. distributivity
3.5	inverse operations, multiplicative inverse creating the multiplicative identity, non-commutativity and non-associativity of division
3.6	extending multiplicative and additive number sense to unknowns
3.7	factors and HCF (by systematic listing), coprime numbers
3.8	multiplicative reasoning: getting from one number to another by multiplying
3.9	continuing geometric sequences
3.10	rectilinear and triangular area
3.11	volume of cubes, cuboids and simple prisms
3.12	applications and problems, including identifying the end number in multiplication; money problems; simple proportion problems; different bases

Unit NP4 - Powers, Roots and Primes

4.1	Squares to 15^2 and cubes to 10^3
4.2	Calculating powers, evaluating numerical expressions with powers, understanding index form
4.3	addition and subtraction rules with positive indices, power of zero
4.4	Roots as inverses of powers
4.5	Writing roots as surds and finding decimal approximations, including bounds of roots (e.g. $9<\sqrt{90}<10$)
4.6	Prime numbers, product of primes, using the primes as building blocks (Fundamental Theorem of Arithmetic), applying the prime factorisation to find the factors of (large) numbers

Spring 1

Unit NP5 - Order of Operations

5.1	Order of operations with the four rules (revisiting work from NP2 & NP3 on reordering calculations correctly)
5.2	Order of operations including indices
5.3	Order of operations including brackets, with integers and decimals
5.4	writing numerical (and algebraic) expressions using the order of operations (function machines)

Unit NP6 - Negative Numbers

6.1	negative numbers in context and on a number line (vertical and horizontal)
6.2	ordering positive and negative numbers, using symbols, placing on a number line
6.3	addition of a negative number
6.4	subtraction of a negative number (as addition of additive inverse)
6.5	multiplication and division with negative numbers
6.6	powers of negative numbers
6.7	order of operations with negatives
6.8	applications (contextual) and problems

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Spring 2

Unit A1 - Introduction to Algebraic Thinking

1.1	Substituting numbers for variables presented as a range of symbols, including blank boxes and letters
1.2	Solving simple 'unknown value' problems, using a range of symbols, including blank boxes and letters
1.3	Simplifying simple additive linear expressions with no more than three variables
1.4	Placing unknowns on a number line using inequalities

Unit NP7 - Fractions

7.1	concept of a fraction, multiple visual representations - shading shapes, bar models, placing on a number line
7.2	proper and improper fractions,
7.3	equivalent fractions, simplifying fractions, comparing the size of fractions through common denominator or common numerator
7.4	complement of a fraction (able to find 1-p, given p)
7.7	adding and subtracting fractions, including proper, improper and mixed
7.8	fraction of an amount by a bar model, expressing one number as a fraction of another, find original amount if you know a fraction of it
7.9	multiplying and dividing fractions, fraction of an amount (incl. fractions of fractions) with link to multiplying; increasing and decreasing by a fraction by multiplying
7.10	multiplication of a number by its reciprocal gives 1 (revisit of NP3.5 more formally)
7.11	order of operations with fractions
7.12	problems: worded fraction problems; comparing natural numbers, integers, and rational numbers (incl fractions and decimals)
7.13	Binary fractions

Summer 1

Unit NP8 - Percentages

8.1	multiple representations of % - shading shapes, bars
8.2	% of an amount, finding the number given a % of it
8.3	expressing one number as a % of another
8.4	equivalence of FDP, techniques to convert, ordering FDP
8.5	percentages greater than 100
8.6	percentage of an amount with a calc (not decimal multipliers)
8.7	percentage increase and decrease, fraction increase and decrease
8.8	the effect of multiplying by numbers between 0 and 1
8.9	applications and problems, including interpreting pie charts and simple interest

Unit NP9 - Estimation & Use of the Calculator

9.1	Revisit rounding to d.p. and s.f.
9.2	Using calculations to identify answers to related calculations
9.3	writing single and double inequalities and representing them on number lines
9.4	rounding errors and error intervals (upper and lower bounds of a rounded number) when rounding
9.5	truncation and error intervals
9.6	approximations to calculations
9.7	using a calculator and interpreting the result, including checking validity through approximation, writing answers "to a suitable degree of accuracy"
9.8	percentage multipliers for finding a percentage (not increasing or decreasing)
9.9	timetables - with and without the time button on the calculator. Solving problems with time accurately and by estimating. Converting units of time with/without calculator

Summer 2

Unit A2 - Manipulating and Simplifying Expressions 1

2.1	Substitution, as motivation for equivalence
2.2	Algebraic notation - ab for a*b, 3y for y+y+y and 3*y, a^4 for a*a*a*a, a^2b for a*a*b, a/b for division, coefficients as fractions not decimals, where brackets can be implied
2.3	collecting like terms
2.4	simplifying indices and coefficients when multiplying and dividing, multiplication rule for indices (power of a power)
2.5	writing algebraic expressions

Unit GM1 - Drawing, Measuring and Constructing

1.1	Using a ruler to measure lines and a protractor to measure angles, labelling segments and angles correctly
1.2	Using a compass to draw circles and arcs; construct and equilateral triangle and a hexagon (60/120 degree angles)
1.3	Constructing triangles given SSS, SAS, ASA
1.4	Constructing a perpendicular bisector, perpendicular from a point on/to a line, angle bisector, know that the shortest distance from a point to a line is the perpendicular, constructing a parallel line
1.5	Constructing 30, 45, 90 angles
1.6	Simple loci - fixed distance from a point, fixed distance from a line, equidistant from a two points, equidistant from two lines

Year 8

Autumn 1: Equations (7 weeks)
Collecting like terms with perimeter **Pre-requisite knowledge:** Simplifying expressions by collecting like terms
Collecting like terms involving indices
Use the addition index law to simplify expressions
Use the subtract index law to simplify expressions
Know the power of a power index law
Multiply out a single bracket
Factorise into a single bracket
Solve one-step equations when the solution is a whole number, fraction or negative number
Solve one-step equations with indices and roots
Solve two-step equations in the form $ax \pm b = c$
Solve two-step equations in the form $ax \pm b = c$, with negative coefficients of x
Solve two-step equations in the form $ax/b \pm c = d$
Solve two-step equations in the form $(ax \pm b)/c = d$
Form expressions in context (from written communication)
Form and solve equations in context (from written communication)
Solve two-step equations involving brackets
Solve equations with unknowns on both sides
Solve equations with unknowns on both sides with negative coefficients of x
Solve equations with unknowns on both sides, involving brackets (H)

Autumn 2: Ratio and Proportion (7 weeks)
Understand and use ratio notation
Use ratio notation and write in a ratio to describe a situation
Simplify Ratio
Simplify ratio with different units
Simplifying in the form 1:n
Find equivalent ratios
Understand the connection between ratios and fractions and proportion
Understand the connection between ratio and proportion
Convert between ratio, fraction & proportion
Dividing a quantity in a given ratio
Divide a quantity in a given ratio in real-life context
Divide into a given ratio when given one part
Divide into a given ratio when given difference
Solve ratio problems that involve dividing into a given ratio
Proportionality
Know the difference between direct proportion & inverse proportion
Recognise the graphs of direct proportion and inverse proportion
Use unitary methods to solve proportion problems
Work out which product is better value for money
Solve proportion problems involving exchange rates
Solve proportion problems involving recipes
Solve proportion problems involving maps and scales
Solve problems involving inverse proportion

Spring 1: Measures: Length, Area and Angles (6.5 weeks)
Perimeter and Area of Polygons
Form and solve equations with perimeter and area of shape **Pre-requisite knowledge:** Perimeter of 2D shapes, Area of rectangles, parallelogram, triangle
Find the area of composite shapes involving rectangles and triangles **Pre-requisite knowledge:** Area of rectangle and Area of compound rectilinear shapes
Find the area of a trapezium
Circumference and Area of Circles
Understand and know the vocabulary of circles
Understand the concept of π
Calculate the circumference of a circle **Pre-requisite knowledge:** Recap of fraction of amounts
Find the perimeter of a semi-circle, quarter-circle & 3/4 circle
Calculate the area of a circle
Calculate the area of a semi-circle, quarter-circle & 3/4 circle
Find the perimeter and area of composite shapes involving circles
Find the volume of cuboids, prisms and cylinders
Angles
Know that an angle is a measure of turn
Identify types of angles and their properties (acute, obtuse, reflex, right-angle)
Measure acute and obtuse angles with a protractor
Measure reflex angles with a protractor
Know and apply the rule that vertically opposite angles are equal
Know and apply the rule that angles around a point add to 360 degrees
Know and apply the rule that angles on a straight line add to 180 degrees
Know and apply the rule that angles in a quadrilateral add up to 360 degrees
Know and apply the rule that angles in a triangle add up to 180 degrees
Solve problems involving a mix of the basic angle rules.
Form and solve equations using angle facts

Year 8	Spring 2: Representations of Data (5 weeks)	Summer 1: Similarity & Congruence (6 weeks)	Summer 2: Probability (7 weeks)
	Types of data	**Similarity & Congruence**	**Introduction to probability**
	Understand the meaning of qualitative and quantitative data	Know the meaning of congruence and identify congruent shapes	Introduce the vocabulary of probability
	Understand the difference between discrete, continuous and bivariate data	Create tesselation of congruent shapes	Use the 0-1 probability scale to measure probability
	Pictograms, Bar Charts and Line Graphs	Know the meaning of similarity and identify similar shapes	List all the outcomes for an experiment, including the use of tables
	Construct and interpret pictograms	Find the missing lengths in similar shapes using a scale factor	Work out theoretical probabilities for a single event
	Construct and interpret bar charts	**Constructions**	Know and apply the fact that the sum of probabilities for all possible outcomes is 1
	Construct and interpret comparative bar charts	Draw triangles with a ruler and protractor (SAS & ASA) **Prior knowledge Check:** Measure and draw angles with a protractor	Find the probability of an event not happening by using the fact that the sum of probabilities for all possible outcomes is 1
	Construct and interpret line graphs	Use compasses to construct circles and arcs	Form and solve equations with probability (H)
	Pie Charts	Use ruler and compasses to construct an equilateral triangle	**Probability through systematic representations**
	Draw a pie chart	Use ruler and compasses to construct triangles when given 3 sides (SSS)	List outcomes of an event systematically (product rule for counting)
	Interpret a pie chart	Construct the perpendicular bisector of a line segment	Use a table to list all outcomes of an event
	Scatter Graphs	Construct a perpendicular from a point to a line	Construct and use sample space diagrams to find probabilities
	Plot scatter graphs	Construct a perpendicular from a point on a line	Construct two-way tables
	Draw the line of best fit	Bisect an angle	Find probability from two-way tables, including conditional probability
	Identify the correlation of a scatter graph	**Shape Transformations**	Use experimental probability to calculate expected outcomes
	Use the line of best fit to estimate values	Construct and describe translations using vectors	Reverse probability problems
	Averages in a list	Construct and describe reflections in horizontal, vertical and diagonal mirror lines	**Probability with venn diagrams**
	Understand that mean, median and mode are averages and range is the measure of spread	Construct and describe rotations using a given angle, direction and centre of rotation	Understand the notation of sets, including union, intersection and complements
	Pre-requisite knowledge: Find the mean	Enlarge a shape when given scale factor and centre of enlargement	Create a venn diagram from sets
	Find the median, mode and range in a set of data	Find the scale factor and centre of englargement	Complete a venn diagram when given written information
	Finding the missing values when given mean, median, mode or/and range	Combine transformations	Find probabilities from a venn diagram
	Averages in frequency tables		Use a venn diagram for conditional probability
	Create a frequency table from a set of data		
	Interpret the data from a frequency table		
	Find the averages and range in a frequency table		

Year 9

Autumn 1: Number (7 weeks)	Autumn 2: Data (7 weeks)	Spring 1: Proportionality (6.5 weeks)
Estimate answers to calculations **Pre-requisite knowledge:** - Round to a given number of decimal places. - To be able to round to a given number of significant figures	Pre-requisite knowledge: Understand the difference between discrete, continuous and bivariate data	**Percentages**
Solve LCM and HCF problems using the listing method **Pre-requisite knowledge:** Find the factors and multiples of a number	Pre-requisite knowledge: Draw and interpret comparative bar charts	Increase and decrease by a percentage (non-calc) **Prior Knowledge Check:** Find a percentage of a quantity (non-calc)
Solve LCM and HCF problems using prime factor decomposition **Pre-requisite knowledge:** Know the 2-digit prime numbers Write a number as a product of prime factors	**Pie Charts**	Finding a percentage of a quantity by multiplying by the decimal equivalent (Calc)
Surds	Pre-requisite knowledge: Draw a pie chart	Increase and decrease by a percentage using a multiplier
Understand the difference between rational and irrational numbers.	Pre-requisite knowledge: Interpret a pie chart	Calculate compound Interest/depreciation
Multiply and divide surds	**Scatter Graphs**	Finding the original amount after a percentage increase/decrease
Simplify a surd **Pre-requisite knowledge:** Powers and roots	Plot and interpret scatter graphs	Finding the percentage change
To be able to use the laws of Indices **Pre-requisite knowledge:** Powers and roots	Use the correlation to describe the relationship between the two variables	Solve percentage and compound interest problems
Understand and use zero and negative indices.	Use the line of best fit to interpolate and extrapolate data	**Ratio & Proportion**
Understand and use fractional indices	**Averages in a list**	Distinguish between different ratio divisions including dividing into a given ratio when given total, given one part and given difference
Combine negative and fractional indices	Finding the missing values when given mean, median, mode or/and range Prior knowledge check: Find the averages and range in a list	Solve real-life problems involving direct proportion (i.e. better value for money, exchange rates, recipes)
Standard Form	Solve changing mean problems (H)	Identify the graphs of direct and inverse proportion
Compare and order numbers in standard form **Pre-requisite knowledge:** Use index notation for powers of 10 Express large and small numbers in standard form Express standard form an an ordinary number	**Stem and Leaf Diagrams**	Know the mathematical symbol for proportion
Multiply and divide numbers written in standard form **Pre-requisite knowledge:** Multiply and divide decimal numbers.	Construct stem and leaf diagrams	Use the algebraic form for direct proportion
Add and Subtract numbers written in standard form	Interpret and calculate averages and range from stem and leaf diagrams	Use the algebraic form for inverse proportion
Use standard form on a calculator	**Averages in frequency tables**	**Compound Measures**
Solve problems with numbers written in standard form.	Find the averages and range in a frequency table	Convert between different units of time
Fractions	Find the averages and range in a grouped frequency table	Understanding the meaning of the units of speed
Calculating with fractions using the four operations	**Line Graphs & Frequency Polygons**	Solve problems involving speed, distance and time
Finding the perimeter of shapes involving fractional lengths	Construct and interpret line graphs	Understanding the meaning of the units of density
Finding the area of rectangles involving fractional lengths	Construct and interpret frequency polygons	Solve problems involving mass, density and volume
Solve problems involving reverse fraction of an amount	Understand the difference between a line graph and a frequency polygon	Understanding the meaning of the units of pressure
FDP conversion	**Time Series**	Solve problems involving force, area & pressure
Calculating with fractions, decimals & percentages using the four operations **Pre-requisite knowledge:** Convert percentages to/from decimals Convert decimals to/from fractions Convert percentages to/from fractions Compare and order a set of numbers involving a mix of fractions, decimals & percentages	Plot and interpret Time series graphs	
	Use trends to make predictions	
	Histograms (H)	
	Construct & Interpret histograms	

Year 9

Spring 2: Equations & Formulae (5 weeks)
Pre-requisite knowledge: Simplifying expressions
Expand brackets involving indices **Pre-requisite knowledge:** Multiplying out a single bracket Addition index law to simplify expressions
Factorising into a single bracket Expand into single brackets involving indices
Expand and simplify **Pre-requisite knowledge:** Multiplying out a single bracket Simplify expressions (four operations)
Expand double brackets (use the grid method)
Form and solve two-step equations **Prior Knowledge Check:** Solving one-step equations
Form and solve equations with unknowns on both sides inc. with negative coefficients of x.
Solve equations with unknowns on both sides, involving brackets
Formulae
Write formulae
Substitute into algebraic and worded formulae
Rearrange formula (one-step)
Rearrange formula (two step)
Find the nth term of a linear sequence
Determine if a number will be in a sequence
Identify quadratic sequences
Substitute into a quadratic sequence
Find the nth term of a quadratic sequence
Expand double brackets

Summer 1: Angles, Pythagoras & Trigonometry (6 weeks)
Angles
Apply the following angle rules in problems: Angles around a point, on a straight line, in a quadrilateral, in a triangle including isosceles; vertically opposite angles
Form and solve equations using angle facts
Angles in Parallel lines
Identify angles in parallel lines (alternate, corresponding, co-interior)
Solve problems involving angles in parallel lines
Interior and Exterior Angles
Find the sum of the angles in a polygon
Find an interior angle of any regular polygon
Find missing angles in any polygon
Find the exterior angle of any polygon
Know that an interior angle can be found using the interior angle
Find the number of sides of a polygon, given the interior/exterior angle
Pythagoras' Theorem
Identify the hypotenuse of a right-angled triangle
Calculate the hypotenuse of a right-angled triangle
Calculate the shorter sides in right-angled triangles
Solve problems involving pythagoras' theorem
Trigonometry
Identify the hypotenuse, adjacent and opposite of a right-angles triangle
Work out the side length using the sine ratio
Work out the side length using the cosine ratio
Work out the side length using the tangent ratio
Use the sin, cos, tan ratios to find the missing angles in a right-angled triangle

Summer 2: Linear graphs (7 weeks)
Recap on coordinates & finding the midpoint of a line.
Identify the gradient and y-intercept from a linear equation.
Rearrange an equation into the form y = mx + c.
Plot graphs with equations in the form, y = mx +c
Plot graphs with equations in the form, ax + by = c.
Sketch graphs using the gradient and intercepts.
Find the equation of a line parallel to x-axis and y-axis
Find the gradient of a line (integer & fractional) using the unit grid
Find the equation of a line
Find the equation of a line, given its gradient and one point on the line.
Find the gradient of a line through two given points.
Find the equation of a line through two given points.
Identify parallel and perpendicular lines
Find the equations of lines parallel or perpendicular to a given line.
Real - life graphs
Draw and interpret real-life linear graphs.
Recognise graphs representing direct proportion and inverse proportion
Quadratic graphs
Draw quadratic graphs
Solve quadratic equations using graphs.
Cubic and reciprocal graphs
Draw graphs of cubic functions.
Draw graphs of reciprocal functions.
Recognise a graph from its shape and properties.