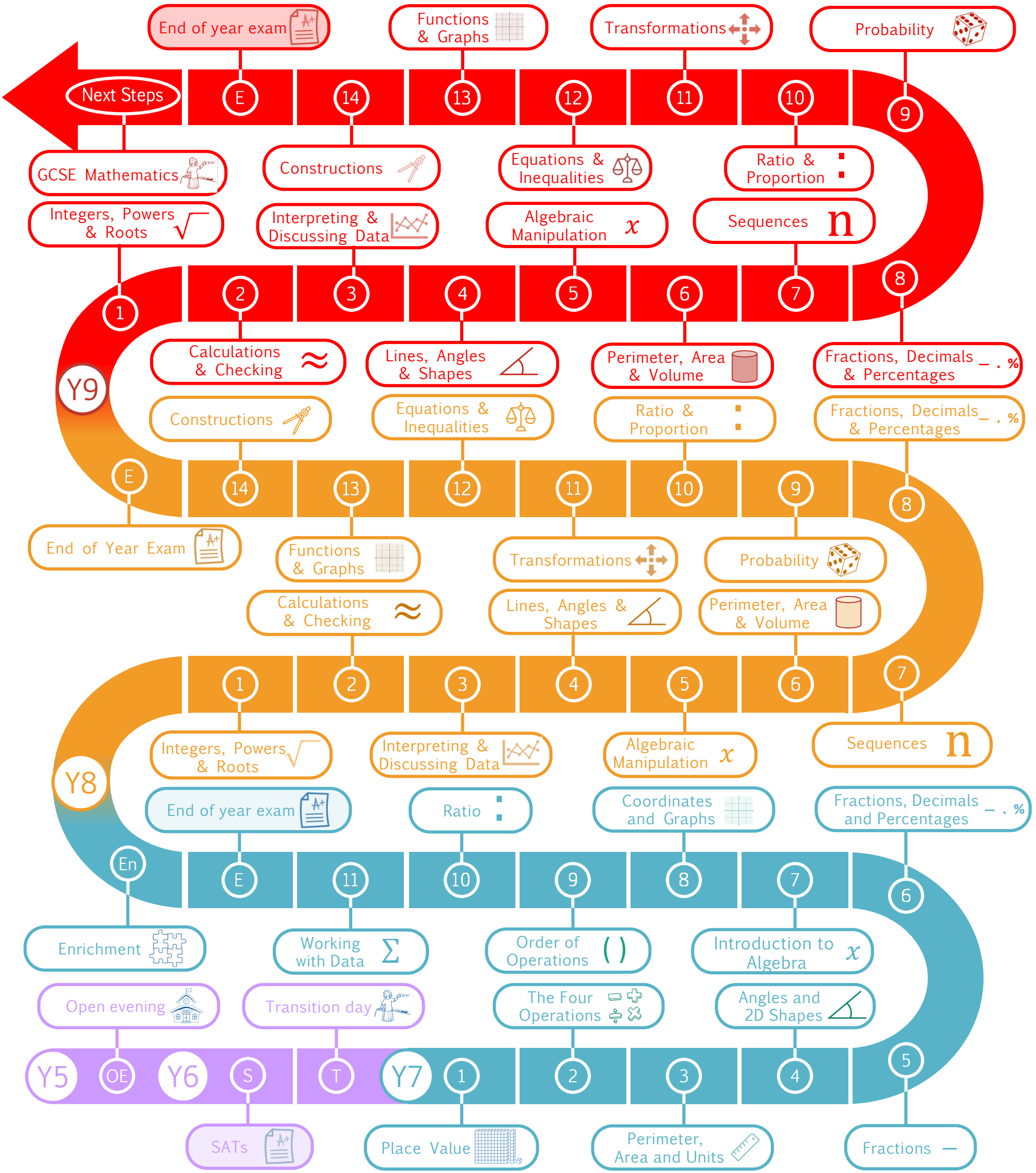
KS3 Mathematics Intent Overview



St Benedict's Department of MATHEMATICS 1971

KS3 Mathematics Intent Overview

Y7	Unit	Students will learn to:
Autumn 1	Place Value	• Understand place value • Round numbers to nearest 10,100,1000, decimal places and significant figures • Multiply and divide numbers by powers of 10 • Write large or small numbers in standard form
	The Four Operations	• Add, subtract, multiply and divide integers, negative numbers and decimals • Identify factors and multiples of numbers • Express numbers as a product of their prime factors • Find the highest common factor and lowest common multiple of two numbers
Autumn 2	Perimeter, Area and Units	• Convert between units of length • Calculate the perimeter of shapes including compound shapes • Calculate the area of a rectangle, triangle, parallelogram and trapezium • Calculate the area and circumference of a circle
	Angles & 2D Shapes	• Measure and draw angles • Calculate missing angles on a straight line and around a point • Calculate missing angles in triangles and quadrilaterals • Calculate the angle sum of regular polygons and calculate interior angles
Spring 1	Fractions	• Compare and order fractions • Add and subtract fractions with different denominators • Convert improper fractions to mixed numbers and vice versa • Add and subtract mixed numbers
	Fractions, Decimals & Percentages	• Identify equivalent fractions, decimals and percentages and order a mix • Find a fraction of an amount including increase and decrease questions • Find a percentage of an amount including increase and decrease questions • Find a percentage change and calculate simple interest
Spring 2	Introduction to Algebra	• Use a function machine to find an input, output or identify a function • Form simple expressions and substitute into expressions • Simplify expressions with and without powers • Expand and simplify single brackets • Factorise into single brackets • Find the next term of a sequence, identify the term-to-term rule and the nth term rule.
	Coordinates & Graphs	• Plot and read coordinates from all four quadrants • Plot coordinates from a rule or table of values to generate a straight line • Identify horizontal and vertical straight lines • Interpret y=mx + c and identify the equation of a straight line given a point and a gradient • Identify parallel lines
Summer 1	Order Of Operations	• Apply equal priority laws to calculations including +,-,x, ÷ and brackets • Calculate integer powers and roots • Apply equal priority laws to calculations including +,-,x, ÷, powers, roots and brackets • Put brackets into a calculation to make it true
	Ratio	• Form and simplify ratios • Share an amount into given ratios • Calculate the best value of items • Use proportion to scale up or down a recipe • Solve direct and indirect proportion problems
Summer 2	Working With Data	• Read from and draw charts to represent data including frequency tables, two-way tables, bar charts, pictograms, stem and leaf diagrams and scatter graphs • Comment on correlation and draw a line of best fit on a scatter graph to make predictions • Calculate the mean, mode, median and range

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Y8	Unit	Students will learn to:
Autumn 1	Integers, Powers & Roots	• Identify factors and multiples of numbers • Express numbers as a product of their prime factors • Find the highest common factor and lowest common multiple of two numbers • Understand and use the laws of indices for multiplying, dividing, **raising to another power, negative powers and fractional powers**
	Calculations & Checking	• Add, subtract, multiply and divide integers, negative numbers and decimals • Round numbers to nearest 10,100,1000, decimal places **and significant figures** • Multiply and divide numbers by powers of 10 and **write large or small numbers in standard form**
Autumn 2	Interpreting & Discussing Data	• Read from and draw charts to represent data including frequency tables, bar charts, stem and leaf diagrams and scatter graphs • Comment on correlation and draw a line of best fit on a scatter graph to make predictions • Calculate the mean, mode, median and range • Construct a pie chart and calculate angles • **Draw and plot a cumulative frequency graph and identify quartiles** • **Draw a box plot**
	Lines, Angles & Shapes	• Identify angles in parallel lines • Calculate the angle sum of regular polygons and calculate interior angles and exterior angles of polygons • **Calculate missing sides of a right-angled triangle using Pythagoras' theorem** • **Use and identify circle theorems**
	Algebraic Manipulation	• Expand and simplify two single brackets • Factorise into single brackets • Calculate the area and perimeter of shapes with side lengths as algebraic expressions • **Expand double brackets including squaring a single bracket** • **Raise an algebraic term to a power**
Spring 1	Perimeter, Area & Volume	• Calculate the area of a trapezium • Calculate the volume of cubes and cuboids including finding missing side lengths • Calculate the area and circumference of a circle • Calculate the volume of a cylinder **and volume of prisms** • Calculate surface area of simple prism **and the surface area of cylinders** • Convert between units of area **and volume** • **Calculate arc length and sector area**
	Sequences	• Generate a sequence from a nth term and identify the nth term rule of a sequence • Decide if a number is in a sequence using the nth term • Generate a sequence from a quadratic nth term **and identify the quadratic nth term of a sequence** • **Continue a geometric sequence and identify the term-to-term rule** • **Identify special sequences (triangle numbers, Fibonacci etc)**
	Fractions, Decimals & Percentages	• Calculate a percentage of an amount including increase and decrease questions • Add, subtract, multiply and divide fractions • Calculate percentage change **and compound interest** • **Simplify algebraic fractions** • **Identify whether a fraction coverts to a terminating or recurring decimal**
Spring 2	Probability	• Calculate relative frequency from a table and understand theoretical vs experimental probability • Calculate probability from a venn diagram **including constructing them** • Calculate probability from a two-way table • **Draw tree diagrams and calculate probabilities from them**
	Ratio & Proportion	• Share an amount into given ratios • Calculate the best value of items • Use proportion in contexts of scale with maps and scale drawings • **Solve ratio problems involving connected ratios** • **Solve direct and indirect proportion problems**
	Transformations	• Enlarge shapes by positive, fractional **and negative scale factors including identifying the centre of enlargement and scale factor** • Reflect a shape in a diagonal mirror line • **Use properties of similar shapes to find missing lengths or areas**
Summer 1	Equations & Inequalities	• Solve two step equations involving brackets and unknowns on both sides **and involving fractions** • Substitute numbers into formulae • Change the subject of a formula **involving powers and roots** • **Solve inequalities** and represent them on a number line
	Functions & Graphs	• Plot parallel lines **and perpendicular lines** and identify the link between the gradients • Calculate the midpoint of a line **and calculate the length of a line** • Calculate the gradient of a line **and identify the equation of a line using a gradient and y intercept** • Calculate and interpret time series graphs • Recognise **and plot** quadratic, cubic and reciprocal graphs
Summer 2	Constructions	• Construct SSS, SAS, ASA, RHS triangles using compasses and a protractor • Construct perpendicular and angle bisectors • Measure draw and calculate bearings

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Y9	Unit	Students will learn to:
Autumn 1	Integers, Powers & Roots	• Understand and use the laws of indices raising to another power, negative powers and fractional powers • **Simplify surds** • **Add, subtract, multiply and divide surds** • **Expand brackets involving surds**
	Calculations & Checking	• Add, subtract, multiply and divide negative numbers • Round numbers to nearest x significant figures **and use to estimate** • Write large or small numbers in standard form • **Calculate with standard form**
Autumn 2	Interpreting & Discussing Data	• Draw and plot a cumulative frequency graph and identify quartiles • Draw a box plot • **Calculate the mean from a grouped frequency table** • **Plot and interpret a histogram** • **Plot and interpret a frequency polygon**
	Lines, Angles & Shapes	• Calculate missing sides of a right-angled triangle using Pythagoras' theorem • Use and identify circle theorems • **Use Pythagoras' theorem in 3D shapes** • **Calculate missing side lengths of right-angled triangles using trigonometry** • **Calculate missing angles of right-angled triangles using trigonometry** • **Know and use other circle theorems**
	Algebraic Manipulation	• Expand double brackets including squaring a single bracket • Raise an algebraic term to a power • **Expand double brackets involving coefficients of x > than 1** • **Factorise quadratic expressions including difference of two squares** • **Simplify algebraic fractions where factorisation is required**
Spring 1	Perimeter, Area & Volume	• Calculate volume of prisms • Calculate the surface area of cylinders • Convert between units of and volume • Calculate arc length, sector area **and the perimeter of a sector** • **Use the formulas to calculate the volume and surface area for a Cone, Pyramid and Sphere**
	Sequences	• Identify the quadratic nth term of a sequence • Continue a geometric sequence and identify the term-to-term rule • Identify special sequences (triangle numbers, Fibonacci etc) • **Identify the quadratic nth term of more complex sequences**
	Fractions, Decimals & Percentages	• Calculate **compound interest** • **Simplify algebraic fractions** • **Identify whether a fraction coverts to a terminating or recurring decimal** • **Calculate reverse percentages** • **Use algebraic methods to convert a recurring decimal to a fraction**
Spring 2	Probability	• Calculate probability from a venn diagram including constructing them • Draw tree diagrams and calculate probabilities from them **including conditional events** • **Use set notation to calculate probabilities from venn diagrams**
	Ratio & Proportion	• Solve ratio problems involving connected ratios • Solve direct and indirect proportion problems • **Calculate the constant of proportionality (k) by using formulas for direct and indirect proportion** • **Recognise direct and indirect proportion from a table**
	Transformations	• Enlarge shapes by negative scale factors including identifying the centre of enlargement and scale factor • Use properties of similar shapes to find missing lengths or areas • **Understand the effect of enlargements on perimeter, area and volumes of shapes** • **Use vector notation to describe the transformation of a shape**
Summer 1	Equations & Inequalities	• Solve two step equations involving fractions • Change the subject of a formula involving powers and roots **and requiring factorisation** • Solve inequalities and represent them on a number line • **Solve simultaneous equations by substitution and elimination**
	Functions & Graphs	• Plot perpendicular lines and identify the link between the gradients • Calculate the length of a line • Identify the equation of a line using a gradient and y intercept • Plot quadratic, cubic and reciprocal graphs • **Prove that two lines are either parallel or perpendicular** • **Plot graphs of more complex quadratic and cubic functions and use the graph to estimate values at specific points, including maxima and minima** • **Solve simultaneous equations graphically**
Summer 2	Constructions	• Measure draw and calculate bearings • Find the point equidistant from two points • **Identify the centre of a circle using a compass and a ruler** • **Solve complex loci problems**