TCS KS3 Maths Curriculum

Year 7

	Outline of Course	Key Assessments	Skill	Key Vocabulary
Autumn 1	**Algebraic thinking** ● Sequences ● Understanding and using algebraic notation ● equality and equivalence	Topic tests and end of unit tests	See appendix for skills (department schemes of work) white rose resources	This document (below) contains a link to key vocabulary and tiers. It will be kept up to date and applies to all parts of our curriculum: white rose resources
Autumn 2	Place value and proportion ● Place value and ordering integers and decimals ● fractions, decimals, and percentage equivalence	Topic tests and end of unit tests		
Spring 1	application of number ● Solving problems with addition and subtraction ● solving problems with multiplication and division	Topic tests and end of unit tests		

	• fractions and percentages of amounts			
Spring 2	directed number and fractional thinking • four operations with directed numbers • addition and subtraction of fractions	Topic tests and end of unit tests		
Summer 1	lines and angles • Constructing, measuring and using geometric notation • developing geometric reasoning	Topic tests and end of unit tests		
Summer 2	reasoning with number • Developing number sense • set some probability • prime numbers and proof	End of year test		

Year 8

	Outline of Course/SOW delivery	**Key Assessments**	**Skill Development**	**Key Vocabulary**
Autumn 1	Proportional reasoning • ratio and scale • multiplicative change • multiplying and dividing fractions	Topic tests and end of unit tests	See appendix for skills (department schemes of work)	This document (below) contains a link to key vocabulary and tiers. It will be kept up to date and applies to all parts of our curriculum: white rose resources

Autumn 2	representations ● working in the cartesian plane ● representing data ● tables and probability	Topic tests and end of unit tests		
Spring 1	algebraic techniques ● brackets, equations and inequalities ● sequences ● indices	Topic tests and end of unit tests		
Spring 2	developing number ● fractions and percentages ● standard index form ● number sense	Topic tests and end of unit tests		
Summer 1	developing geometry ● angles in parallel lines and polygons ● area of trapezia and circles ● line symmetry and reflection	Topic tests and end of unit tests		
Summer 2	reasoning with data ● the data handling cycle ● measures of location	End of year test		

At this point (end of year 8) we start considering whether students will be potential Higher or Foundation students for KS4 (which is over one year away). This 'pathways' approach is a differentiated process that allows us to ensure students can master particular fundamental topics before moving on. Due to the high amount of crossover topics between grades 3 to 6 in GCSE there is no problem with students moving from foundation to higher (or vice versa). We then reassess at the end of year 9.

Year 9 (foundation)

	Outline of Course/SOW delivery	Key Assessments	Skill Development	Key Vocabulary
Autumn 1	Number basics and understanding of number. ● Integers and place value. ● Decimals. ● indices, powers and roots ● factors, multiples and primes	Topic tests and end of unit tests	See appendix for skill on department schemes of work.	
Autumn 2	Algebra, basic skills. ● Algebra: The basics ● expanding and factorising brackets ● Expressions and substitution into formula	Topic tests and end of unit tests		
Spring 1	Data presentation ● charts and graphs ● pie charts ● scattergraphs	Topic tests and end of unit tests		
Spring 2	Advanced number work ● fractions ● fractions, decimals and percentages ● percentages	Topic tests and end of unit tests		
Summer 1	Solving using Algebra ● equations ● inequalities ● sequences	Topic tests and end of unit tests		
Summer 2	Angles and shape	End of year test		

	• properties of shapes, parallel lines and angle facts • interior and exterior angles of polygons • statistics and sampling • the averages			

Year 9 (higher)

	Outline of Course/SOW delivery	Key Assessments	Skill Development	Key Vocabulary
Autumn 1	Number basics and understanding of number. • Calculations, checking and rounding • indices, roots, reciprocals and hierarchy of operations • Factors, multiples and primes • standard form and surds	Topic tests and end of unit tests	See appendix for skill on department schemes of work.	
Autumn 2	Algebra, basic skills. • Algebra; the basics • Setting up, rearranging and solving equations • Sequences	Topic tests and end of unit tests		
Spring 1	Data presentation • averages and range • representing and interpreting data Scatter graphs	Topic tests and end of unit tests		
Spring 2	Advanced number work • fractions • percentages • ratio and proportion	Topic tests and end of unit tests		

Summer 1	Angles and shape ● polygons, angles and parallel lines ● pythagoras' theorem and trigonometry	Topic tests and end of unit tests		
Summer 2	Algebra and graphing ● graphs : the basics and real life graphs ● linear graphs and coordinate geometry ● quadratic, cubic and other graphs	End of year test		

Appendix

Specific detail of skills taught in units during lessons. i.e. what would you see:

Year 9 – Foundation

Unit number		Topics covered	Time scale	cross over topics		
1	a	Integers and place value	Autumn Term Yr9	Round numbers and measures to an appropriate degree of accuracy (dp or sig fig)	Use the square, cube and power keys on a calculator	To understand the difference between squaring a negative number and subtracting a squared number within a more complex calculation
	b	Decimals				

	c	Indices, powers and roots		Use the index laws to include negative power answers and understand that these answers are smaller than 1	Calculate with roots (surds - exact values)	Use the laws of indices to multiply and divide numbers written in index notation	Use the laws of indices for a number written in index form raised to a power e.g. $(3^2)^4$						
	d	Factors, multiples and primes		Find HCF and LCM using Prime Factors	Given a number written as a product of it prime factors, use this to write a multiple of the number as a product of its prime factors								
2	a	Algebra: the basics		Multiply out brackets involving positive or negative terms (a ± b)(c ± d)	Simplify expressions involving brackets and powers e.g. $x(x^2+x+4)$, $3(a + 2b) - 2(a + b)$	Square a linear expression and collect like terms	Factorise to one bracket by taking out the highest common factors for all terms e.g. $2x^2y + 6xy^2 = 2xy(x + 3y)$	Select an expression/ equation/ formula/identity from a list	Substitute positive and negative integers into linear expressions and expressions involving powers	Find a counter-example to prove that a statement is not true	Simplify more complex expressions involving index notation. E.g. $3a^4b^2 \times 5a^3b^{-1}$, $(3a^4)^2$		
	b	Expanding and factorising single brackets											
	c	Expressions and substitution into formulae		Construct and solve equations that involves multiplying out brackets by a negative number (e.g. 4(2a - 1) = 32 - 3(2a - 2))	Construct and solve equations from geometrical information where the unknown is on both sides of the equation	Solve equations involving fractions e.g. x/3 + 2 = 10 or (x + 2)/3 = 10	Solve equations of the form (ax +/- b)/c =(dx +/- e)/f [one of c or f should be 1]	Solve simple equations involving squares e.g. $x^2 + 10 = 74$	Use systematic trial and improvement to find the approximate solution to one decimal place of equations such as $x^3 + x = 50$	Construct and solve equations from geometrical information	Multiply and simplify algebraic fractions	Given f(x) find f(a) where a is a integer or fraction	Given f(x) where f(x) is a linear function, find a when f(a) = whole number

	a	Tables	Spring Term Yr9									
	b	Charts and graphs		Describe correlation by inspection: strong or weak; positive, negative or zero	Draw a line of best fit by eye and understand what they represent	Interpret scatter graphs in terms of the relationship between two variables	Know that extrapolation might not be reliable	Understand that correlation does not imply causality	Use the line of best fit to make predictions	Construct cumulative frequency tables	Interpret box plots to find median, quartiles, range and interquartile range and draw conclusions	Calculate the interquartile range of a set of discrete data
3	c	Pie charts		Understand that the frequency represented by corresponding sectors in two pie charts is dependent upon the total populations represented by each of the pie charts								
	d	Scatter graphs		Describe correlation by inspection: strong or weak; positive, negative or zero	Draw a line of best fit by eye and understand what they represent	Interpret scatter graphs in terms of the relationship between two variables	Know that extrapolation might not be reliable	Understand that correlation does not imply causality	Use the line of best fit to make predictions			
4	a	Fractions		Multiply and divide simple fractions (mixed) - positive and negative	Divide a fraction by an integer	Divide an integer by a fraction	Find the reciprocal of simple numbers/fractions mentally, e.g. 10 and 1/10, 1/3 and 3 etc.	Solve problems involving addition and subtraction of fractions including mixed numbers				
	b	Fractions, decimals and percentages										

	c	Percentages		Find the original amount given the final amount after a percentage change (reverse percentages)	Calculate repeated proportional change	Use compound interest						
5	a	Equations	Summer Term Yr9	Construct and solve equations that involves multiplying out brackets by a negative number (e.g. 4(2a - 1) = 32 - 3(2a - 2))	Construct and solve equations from geometrical information where the unknown is on both sides of the equation	Solve equations involving fractions e.g. x/3 + 2 = 10 or (x + 2)/3 = 10	Solve equations of the form (ax +/- b)/c =(dx +/- e)/f [one of c or f should be 1]	Solve simple equations involving squares e.g. $x^2 + 10 = 74$	Use systematic trial and improvement to find the approximate solution to one decimal place of equations such as $x^3 + x = 50$	Construct and solve equations from geometrical information	Solve simultaneous equation, linear/linear simultaneous equations, where neither or one equation needs multiplying	Write simultaneous equations to represent a situation
	b	Inequalities		Solve more complex linear inequalities in one variable and represent the solution on a number line e.g. -6 < 2n+4 or -9 < 2n + 3 < 7	Represent the solution set for inequalities using set notation	Solve more complex linear inequalities in one variable where the unknown is on both sides of the inequality	Identify the upper and lower bounds of a measurement	Calculate the upper and lower bounds of 2-D measurements involving addition e.g. perimeter	Use inequality notation to specify simple error intervals due to truncation or rounding			
	c	Sequences		Find and use the nth term of an arithmetic sequence								
6	a	Properties of shapes, parallel lines and angle facts										

	b	Interior and exterior angles of polygons		Calculate the interior angles of polygons	Solve two or more step angle problems using angle facts for parallel lines including the use of bearings	Find the size of each interior angle or the size of each exterior angle or the number of sides of a regular polygon	Use two or more step angle problems by finding interior or exterior angles in regular polygons	Solve angle problems by constructing and solving equations			
7	a	Statistics and sampling		Know the definition of random sampling							
	b	The averages		Estimate the mean of grouped data using the mid-interval value	Calculate possible values of the set of data given summary statistics	Find the median, mode and range from a stem and leaf diagram	Compare the mean, median, mode and range as appropriate of two distributions	Recognise the advantages and disadvantages between measures of average	Find missing data values given the mean and the number of values	Estimate the median from a grouped frequency table with equal class widths	Given the number of values and mean of two data sets, combine to find the overall mean.

Year 9 – Higher

Unit number		Topics covered	Timescale			
1	a	Calculations, checking and rounding	Autumn Term Yr9	Round numbers and measures to an appropriate degree of accuracy (dp or sig fig)	Use the square, cube and power keys on a calculator	To understand the difference between squaring a negative number and subtracting a squared number within a more complex calculation

	b	Indices, roots, reciprocals and hierarchy of operations		Use the index laws to include negative power answers and understand that these answers are smaller than 1	Calculate with roots (surds - exact values)	Use the laws of indices to multiply and divide numbers written in index notation	Use the laws of indices for a number written in index form raised to a power e.g. $(3^2)^4$				
	c	Factors, multiples and primes		Find HCF and LCM using Prime Factors	Given a number written as a product of it prime factors, use this to write a multiple of the number as a product of its prime factors						
	d	Standard form and surds		Interpret a calculator display using standard form	Convert between large and small numbers into standard form and vice-versa	Recognise numbers written in standard form	Order numbers written in standard index form				
2	a	Algebra: the basics		Multiply out brackets involving positive or negative terms $(a \pm b)(c \pm d)$	Simplify expressions involving brackets and powers e.g. $x(x^2+x+4)$, $3(a + 2b) - 2(a + b)$	Square a linear expression and collect like terms	Factorise to one bracket by taking out the highest common factors for all terms e.g. $2x^2y + 6xy^2 = 2xy(x + 3y)$	Select an expression/ equation/ formula/identity from a list	Substitute positive and negative integers into linear expressions and expressions involving powers	Find a counter-example to prove that a statement is not true	Simplify more complex expressions involving index notation. E.g. $3a^4b^2 \times 5a^3b^{-1}$, $(3a^4)^2$

	b	Setting up, rearranging and solving equations		Construct and solve equations that involves multiplying out brackets by a negative number (e.g. 4(2a - 1) = 32 - 3(2a - 2))	Construct and solve equations from geometrical information where the unknown is on both sides of the equation	Solve equations involving fractions e.g. x/3 + 2 = 10 or (x + 2)/3 = 10	Solve equations of the form (ax +/- b)/c =(dx +/- e)/f [one of c or f should be 1]	Solve simple equations involving squares e.g. $x^2 + 10 = 74$	Use systematic trial and improvement to find the approximate solution to one decimal place of equations such as $x^3 + x = 50$	Construct and solve equations from geometrical information	
	c	Sequences		Find and use the nth term of an arithmetic sequence							
3	a	Averages and range	Spring Term Yr9	Estimate the mean of grouped data using the mid-interval value	Calculate possible values of the set of data given summary statistics	Find the median, mode and range from a stem and leaf diagram	Compare the mean, median, mode and range as appropriate of two distributions	Recognise the advantages and disadvantages between measures of average	Find missing data values given the mean and the number of values	Estimate the median from a grouped frequency table with equal class widths	Given the number of values and mean of two data sets, combine to find the overall mean.
	b	Representing and interpreting data		Understand that the frequency represented by corresponding sectors in two pie charts is dependent upon the total populations represented by each of the pie charts							
	c	Scatter graphs		Describe correlation by inspection: strong or weak; positive, negative or zero	Draw a line of best fit by eye and understand what they represent	Interpret scatter graphs in terms of the relationship between two variables	Know that extrapolation might not be reliable	Understand that correlation does not imply causality	Use the line of best fit to make predictions		

4	a	Fractions		Multiply and divide simple fractions (mixed) - positive and negative	Divide a fraction by an integer	Divide an integer by a fraction	Find the reciprocal of simple numbers/fractions mentally, e.g. 10 and 1/10, 1/3 and 3 etc.	Solve problems involving addition and subtraction of fractions including mixed numbers			
	b	Percentages		Find the original amount given the final amount after a percentage change (reverse percentages)	Calculate repeated proportional change	Use compound interest					
	c	Ratio and proportion		Use measures in ratio and proportion problems (currency conversion, rates of pay, best value)	Compare ratios by changing them to the form 1 : m or m : 1	Interpret and write ratios to describe a situation	Divide a quantity into more than two parts in a given ratio	Solve a ratio problem in context	Simplify a ratio expressed in different units	Express a multiplicative relationship between two quantities as a ratio or a fraction	Set up equations to show direct proportion
5	a	Polygons, angles and parallel lines	Summer Term Yr9	Calculate the interior angles of polygons	Solve two or more step angle problems using angle facts for parallel lines including the use of bearings	Find the size of each interior angle or the size of each exterior angle or the number of sides of a regular polygon	Use two or more step angle problems by finding interior or exterior angles in regular polygons	Solve angle problems by constructing and solving equations			
	b	Pythagoras' Theorem and trigonometry		Given the coordinates of points A and B, calculate the length of AB	Justify if a triangle is right-angled given its three lengths	Know the formula for Pythagoras' theorem and use to find the hypotenuse	Begin to use the trigonometric ratios to find the size of an angle in a right-angled triangle	Know the exact values of sin θ and cos θ for θ = 0°, 30°, 45°, 60° and 90°; know the exact value of tan θ for θ = 0°, 30°, 45° and 60°	Use and apply Pythagoras' theorem to solve problems in 2D	Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle, using straight-forward algebraic manipulation, e.g. calculate the adjacent (using cosine), or the opposite (using sine or tangent ratios)	

6	a	Graphs: the basics and real-life graphs		Interpret gradient as rate of change in distance-time and speed-time graphs, containers emptying and filling and unit price graphs	Know that the gradient of a line is the change in y over change in x.	Know that the gradient of a velocity time graph represents acceleration	Interpret distance-time graphs and calculate the speed of individual sections, total distance and total time	Interpret the gradient of a straight line graph as a rate of change			
	b	Linear graphs and coordinate geometry		Find the equation of a straight-line from its graph	Find the equation of a real-life straight line graph that goes through the origin	Identify and interpret gradient and y intercept from an equation y=mx+c	Plot and draw graphs of straight lines using a table of values given in the form ax + by = c	Identify parallel lines from their equations where they have to be rearranged first	Without drawing the graphs, compare and contrast features of graphs such as y = 4x, y = 4x + 6, y = x + 6, y = -4x, y= x - 6	Plot and draw graphs of straight lines WITHOUT using a table of values (use intercept and gradient)	Write down the equation of a line parallel to a given line
	c	Quadratic, cubic and other graphs		Construct a table of values, including negative values of x for a function such as $y = ax^2$	Generate points and plot graphs of simple cubic functions, then more general functions	Identify and interpret roots, intercepts and turning points of a quadratic graph	Recognise a graph which represents a quadratic function	Identify the line of symmetry of a quadratic graph			