

TCS KS3 Maths Curriculum

Year 7

| | Outline of Course | Key Assessments | Skill | Key Vocabulary |
|----------|--|-----------------------------------|--|---|
| Autumn 1 | Algebraic thinking <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Place value and ordering integers and decimals fractions, decimals, and percentage equivalence | Topic tests and end of unit tests | | |
| Spring 1 | application of number <ul style="list-style-type: none"> Solving problems with addition and subtraction solving problems with multiplication and division | Topic tests and end of unit tests | | |

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| | <ul style="list-style-type: none"> fractions and percentages of amounts | | | |
| Spring 2 | <p>directed number and fractional thinking</p> <ul style="list-style-type: none"> four operations with directed numbers addition and subtraction of fractions | Topic tests and end of unit tests | | |
| Summer 1 | <p>lines and angles</p> <ul style="list-style-type: none"> Constructing, measuring and using geometric notation developing geometric reasoning | Topic tests and end of unit tests | | |
| Summer 2 | <p>reasoning with number</p> <ul style="list-style-type: none"> 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 |
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| Autumn 1 | <p>Proportional reasoning</p> <ul style="list-style-type: none"> ratio and scale multiplicative change multiplying and dividing fractions | Topic tests and end of unit tests | See appendix for skills (department schemes of work) | <p>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:</p> <p>white rose resources</p> |

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| Autumn 2 | representations <ul style="list-style-type: none"> ● working in the cartesian plane ● representing data ● tables and probability | Topic tests and end of unit tests | | |
| Spring 1 | algebraic techniques <ul style="list-style-type: none"> ● brackets, equations and inequalities ● sequences ● indices | Topic tests and end of unit tests | | |
| Spring 2 | developing number <ul style="list-style-type: none"> ● fractions and percentages ● standard index form ● number sense | Topic tests and end of unit tests | | |
| Summer 1 | developing geometry <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● Algebra: The basics ● expanding and factorising brackets ● Expressions and substitution into formula | Topic tests and end of unit tests | | |
| Spring 1 | Data presentation <ul style="list-style-type: none"> ● charts and graphs ● pie charts ● scattergraphs | Topic tests and end of unit tests | | |
| Spring 2 | Advanced number work <ul style="list-style-type: none"> ● fractions ● fractions, decimals and percentages ● percentages | Topic tests and end of unit tests | | |
| Summer 1 | Solving using Algebra <ul style="list-style-type: none"> ● equations ● inequalities ● sequences | Topic tests and end of unit tests | | |
| Summer 2 | Angles and shape | End of year test | | |

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| | <ul style="list-style-type: none"> ● properties of shapes, parallel lines and angle facts ● interior and exterior angles of polygons ● statistics and sampling ● the averages | | | |
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Year 9 (higher)

| | Outline of Course/SOW delivery | Key Assessments | Skill Development | Key Vocabulary |
|----------|---|-----------------------------------|---|----------------|
| Autumn 1 | Number basics and understanding of number. <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● Algebra; the basics ● Setting up, rearranging and solving equations ● Sequences | Topic tests and end of unit tests | | |
| Spring 1 | Data presentation <ul style="list-style-type: none"> ● averages and range ● representing and interpreting data Scatter graphs | Topic tests and end of unit tests | | |
| Spring 2 | Advanced number work <ul style="list-style-type: none"> ● fractions ● percentages ● ratio and proportion | Topic tests and end of unit tests | | |

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| Summer 1 | <p>Angles and shape</p> <ul style="list-style-type: none"> ● polygons, angles and parallel lines ● pythagoras' theorem and trigonometry | Topic tests and end of unit tests | | |
| Summer 2 | <p>Algebra and graphing</p> <ul style="list-style-type: none"> ● 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 | | | | |

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| | 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 its 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 $(a \pm b)(c \pm d)$ | 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 | 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 $(ax \pm b)/c = (dx \pm e)/f$ [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 $x^2 + x = 50$ | 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 |

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| 3 | 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 |
| | 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 | | | | | | | | | | |

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| | 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 |

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 |

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| | 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 its 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/ 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. $3a^4b^2 \times 5a^3b^{-1}$, $(3a^4)^2$ |

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|---|---|---|-----------------|--|---|---|---|--|--|--|---|
| | 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 | | |

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| 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 $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° ; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ 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) | |

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| 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 | | | |