



Maths

## Year 7 - Half Term 1 - Algebraic Thinking

<b>Prior Learning</b>	At KS2 pupils will have seen number and shape patterns and used one-step equations.
<b>What will I learn?</b>	Sequences will be explored with diagrams, numbers and graphs. You will develop a deep understanding of basic algebraic forms using function machines. You will form and solve one-step linear equations.
<b>Next Steps</b>	You will use these skills in Year 8 HT 3 for finding nth terms of a sequence and in solving equations with more than one step.
<b>Personal Development</b>	Looking for patterns is a skill needed in many career choices. Algebraic skills are needed for computing, gaming and engineering as well as many other areas.
<b>Key vocabulary</b>	Sequence, rule, linear, non-linear, ascending, descending, geometric, <b>estimate</b> , inverse, expression.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed as homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/237-lesson/sequences">https://app.mymaths.co.uk/237-lesson/sequences</a> <a href="https://app.mymaths.co.uk/1733-lesson/equations-1-one-step">https://app.mymaths.co.uk/1733-lesson/equations-1-one-step</a> <a href="https://app.mymaths.co.uk/201-lesson/function-machines">https://app.mymaths.co.uk/201-lesson/function-machines</a>
<b>Enrichment opportunities</b>	BBC Bitesize: <a href="https://www.bbc.co.uk/bitesize/subjects/zqhs34j">https://www.bbc.co.uk/bitesize/subjects/zqhs34j</a> Puzzles and problems: <a href="http://www.nrich.maths.org/9431">www.nrich.maths.org/9431</a> <a href="http://www.nrich.maths.org/308">www.nrich.maths.org/308</a>  Look for patterns in everyday life: <a href="https://artplusmarketing.com/using-patterns-to-make-sense-of-your-world-d8034650bd98?gi=b14568f49766">https://artplusmarketing.com/using-patterns-to-make-sense-of-your-world-d8034650bd98?gi=b14568f49766</a>

## Year 7 - Half Term 2- Place Value and Proportion

<b>Prior Learning</b>	In KS2 pupils will have used numbers up to 10 million, be familiar with number lines, negative numbers and tenths and hundredths. Topics from last term such as sequences and equations will be interleaved into this unit.
<b>What will I learn?</b>	Explore integers up to one billion and decimals to hundredths. Using and understanding number lines. Exploring median and range. Rounding numbers to powers of 10 and significant figures. Gain a deep understanding of the links between fractions, decimals and percentages. Pie charts will be introduced.
<b>Next Steps</b>	These concepts will be built upon further in Y7 HT6- Developing number sense and in Y8 HT1- Multiplicative change, HT2- Representing data, HT4- Fractions & percentages.
<b>Personal Development</b>	Numeracy is an essential life skill, understanding number is an integral part of everyday life both at work and at home. Estimation can be used in a variety of contexts such as in a weekly food shop. Data analysis will be used in many future careers. It can also be seen regularly on the news, for example, when looking at the progress of Coronavirus in our country.
<b>Key vocabulary</b>	integer, <b>sector</b> , improper, mixed number, <b>estimate</b> , range, median, average, significant figure, standard form
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set appropriate tasks. Some will be completed at homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/141-lesson/frac-dec-perc-1">https://app.mymaths.co.uk/141-lesson/frac-dec-perc-1</a> <a href="https://app.mymaths.co.uk/142-lesson/frac-dec-perc-2">https://app.mymaths.co.uk/142-lesson/frac-dec-perc-2</a> <a href="https://app.mymaths.co.uk/71-lesson/rounding-to-10-100">https://app.mymaths.co.uk/71-lesson/rounding-to-10-100</a> <a href="https://app.mymaths.co.uk/75-lesson/significant-figures">https://app.mymaths.co.uk/75-lesson/significant-figures</a> <a href="https://app.mymaths.co.uk/354-lesson/reading-pie-charts">https://app.mymaths.co.uk/354-lesson/reading-pie-charts</a>
<b>Enrichment opportunities</b>	Pupils could investigate further how very large or small numbers are used in everyday life (e.g.) distances in space or the size of a micro-organism. <a href="https://www.britannica.com/topic/large-numbers-1765137">https://www.britannica.com/topic/large-numbers-1765137</a>  Puzzles & problems: <a href="http://www.nrich.org/684">www.nrich.org/684</a> <a href="http://www.nrich.org/summingconsecutive">www.nrich.org/summingconsecutive</a>

## Year 7 - Half Term 3 - Applications of Number

<b>Prior Learning</b>	This unit will build upon pupils knowledge of addition, subtraction, multiplication and division from KS2. It will also require skills from HT 1 such as solving one-step equations.
<b>What will I learn?</b>	<p>Addition and subtraction will be looked at in the context of interpreting and solving problems in a variety of situations.</p> <p>Multiplication and division will be studied to allow pupils to form and solve two step equations. The emphasis will be on problem solving in a variety of contexts. There will also be some exploration of directed number.</p> <p>Fractions and percentages of quantities will also be looked at.</p>
<b>Next Steps</b>	<p>Much of this work will lead into next term when studying directed number.</p> <p>Fractions and percentages of quantities will be studied in depth in Year 8.</p>
<b>Personal Development</b>	Numeracy skills are essential to everyday life. The use of percentages can be seen in bank accounts, mortgages, loans and investments (e.g.) the amount of interest paid on a loan is usually given as a percentage.
<b>Key vocabulary</b>	commutative, <b>equivalence</b> , equation, polygon, product, integer, <b>factor</b> , multiple, remainder, expression
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.</p>
<b>Resources to use</b>	<p>Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed at homeworks.</p> <p>Here are some lessons you may find helpful.</p> <p><a href="https://app.mymaths.co.uk/1716-lesson/more-written-methods">https://app.mymaths.co.uk/1716-lesson/more-written-methods</a></p> <p><a href="https://app.mymaths.co.uk/1719-lesson/short-and-long-multiplication">https://app.mymaths.co.uk/1719-lesson/short-and-long-multiplication</a></p> <p><a href="https://app.mymaths.co.uk/1715-lesson/short-division">https://app.mymaths.co.uk/1715-lesson/short-division</a></p> <p><a href="https://app.mymaths.co.uk/5777-lesson/introducing-negative-numbers">https://app.mymaths.co.uk/5777-lesson/introducing-negative-numbers</a></p> <p><a href="https://app.mymaths.co.uk/87-lesson/fractions-of-amounts">https://app.mymaths.co.uk/87-lesson/fractions-of-amounts</a></p> <p><a href="https://app.mymaths.co.uk/139-lesson/percentages-of-amounts-1">https://app.mymaths.co.uk/139-lesson/percentages-of-amounts-1</a></p>
<b>Enrichment opportunities</b>	<p>Puzzles:</p> <p><a href="http://www.nrich.maths.org/10180">www.nrich.maths.org/10180</a></p> <p><a href="http://www.nrich.maths.org/11681">www.nrich.maths.org/11681</a></p> <p>Find out how do we use percentages in banking:</p> <p><a href="http://www.moneysavingsexpert.com/banking">www.moneysavingsexpert.com/banking</a></p>

## Year 7 - Half Term 4 - Directed Number & Fractional Thinking

<b>Prior Learning</b>	Students will only have a limited experience of directed number from KS2. Students will build on previous topics from Y7 (substitution, solving equations and fraction, decimal and percentages)
<b>What will I learn?</b>	You will deepen your knowledge of directed number. You will use directed number in substitution and in solving two step equations. You will be extending your knowledge of fraction to enable you to add and subtract fractions in a variety of contexts.
<b>Next Steps</b>	Directed number can be found in many units of study and is an essential skill in all areas of maths. Year 8 HT 3 will see more use of solving equations. Year 8 HT 1 will see fractions work extended to multiplication and division.
<b>Personal Development</b>	Numeracy skills are essential for everyday life. Directed number is important in the understanding of bank accounts, weather forecasts, temperature and sea level.
<b>Key vocabulary</b>	Positive, negative, reflection, symmetric, sea level, ascending, descending, difference, increase, decrease, add, minus, subtract, partition, product, multiply, commutative, inverse, substitute, <b>evaluate</b> , expression, order of operations, solve, equation, balance, solution, indices, priority, square, root, power, equal, <b>equate</b> , congruent, divide, denominator, numerator, whole, multiple, mixed number, unit fraction, integer, equivalent, improper fraction, simplify.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed at homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/47-lesson/negative-numbers-1">https://app.mymaths.co.uk/47-lesson/negative-numbers-1</a> <a href="https://app.mymaths.co.uk/1776-lesson/negative-numbers-in-context">https://app.mymaths.co.uk/1776-lesson/negative-numbers-in-context</a> <a href="https://app.mymaths.co.uk/48-lesson/negative-numbers-2">https://app.mymaths.co.uk/48-lesson/negative-numbers-2</a> <a href="https://app.mymaths.co.uk/91-lesson/adding-subtracting-fractions">https://app.mymaths.co.uk/91-lesson/adding-subtracting-fractions</a>
<b>Enrichment opportunities</b>	Fraction puzzles: <a href="https://nrich.maths.org/keepitsimple">https://nrich.maths.org/keepitsimple</a> <a href="https://nrich.maths.org/5467">https://nrich.maths.org/5467</a> Directed numbers in real life: <a href="https://lifethroughamathematicianseyes.wordpress.com/2017/11/22/negative-numbers-in-real-life/">https://lifethroughamathematicianseyes.wordpress.com/2017/11/22/negative-numbers-in-real-life/</a> <a href="https://www.open.edu/openlearn/ocw/mod/oucontent/view.php?id=18442&amp;section=2">https://www.open.edu/openlearn/ocw/mod/oucontent/view.php?id=18442&amp;section=2</a>

## Year 7 - Half Term 5 - Lines and Angles

<b>Prior Learning</b>	<p>Students will have some KS2 skills in using rulers, protractors and other measuring equipment.</p> <p>Students will be familiar with the correct geometric names for angles and shapes.</p> <p>Prior knowledge of pie charts from Yr 7 HT 2</p>
<b>What will I learn?</b>	<p>You will be drawing increasingly complex diagrams. Pie charts will be drawn to gain further practice of drawing and measuring angles.</p> <p>You will study polygons and angle rules.</p> <p>You will be using the correct mathematical language.</p>
<b>Next Steps</b>	<p>Pie charts will be revisited in Yr 8 HT 2 (representing data)</p> <p>Geometry will be studied further in Yr 8 HT 5</p>
<b>Personal Development</b>	<p>Construction skills are used in many career paths such as architecture, engineering and art.</p> <p>Construction and understanding of how data is displayed is a skill needed in many jobs and in daily life, such as understanding newspaper articles.</p> <p>Bearings are used in the shipping and aerospace industries to help navigation.</p>
<b>Key vocabulary</b>	<p>Line, line segment, geometric figure, degrees, angles, rotation, acute, reflex, obtuse, right-angle, interior, exterior, protractor, sum, measure, <b>construct</b>, parallel, perpendicular, intersect, equilateral, isosceles, scalene, square, rectangle, kite, parallelogram, trapezium, rhombus, quadrilateral, edges, vertices, proportion, frequency, comparison, <b>sector</b>, co-interior, alternate, corresponding.</p>
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini whiteboards will be used to check pupils' understanding on a particular topic. Short end-of-block tests will be used alongside longer end-of-term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.</p>
<b>Resources to use</b>	<p>Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit.</p> <p>Class teachers will set lessons and tasks, some of which will be completed at homeworks.</p> <p>Here are some lessons you may find helpful.</p> <p><a href="https://app.mymaths.co.uk/244-lesson/properties-of-triangles">https://app.mymaths.co.uk/244-lesson/properties-of-triangles</a></p> <p><a href="https://app.mymaths.co.uk/245-lesson/lines-and-quadrilaterals">https://app.mymaths.co.uk/245-lesson/lines-and-quadrilaterals</a></p> <p><a href="https://app.mymaths.co.uk/5775-lesson/angles-2">https://app.mymaths.co.uk/5775-lesson/angles-2</a></p> <p><a href="https://app.mymaths.co.uk/254-lesson/measuring-angles">https://app.mymaths.co.uk/254-lesson/measuring-angles</a></p> <p><a href="https://app.mymaths.co.uk/355-lesson/drawing-pie-charts">https://app.mymaths.co.uk/355-lesson/drawing-pie-charts</a></p>
<b>Enrichment opportunities</b>	<p>Polygon puzzles:</p> <p><a href="https://nrich.maths.org/11498">https://nrich.maths.org/11498</a></p> <p><a href="https://nrich.maths.org/polygonrings">https://nrich.maths.org/polygonrings</a></p> <p>How bearings are used at sea:</p> <p><a href="https://www.youtube.com/watch?v=dp9lXsr1z2I">https://www.youtube.com/watch?v=dp9lXsr1z2I</a></p> <p>University of Leicester:</p> <p><a href="https://www2.le.ac.uk/offices/ld/all-resources/numerical-data/pie-charts">https://www2.le.ac.uk/offices/ld/all-resources/numerical-data/pie-charts</a></p>

## Year 7 - Half Term 6 - Reasoning with Number

<b>Prior Learning</b>	Students will have mental strategies and knowledge of multiples, factors and primes from KS2. In this unit, students will also build upon knowledge of sequences, algebraic manipulation and FDP equivalence.
<b>What will I learn?</b>	<p>You will review and extend mental strategies and use this knowledge with known algebraic facts.</p> <p>FDP equivalence will be used in probability and you will learn about sets and set notation.</p> <p>Factors, multiples and primes will be revisited and you will solve HCF &amp; LCM problems possibly with the use of Venn diagrams.</p>
<b>Next Steps</b>	You will study probability further in HT 2 of Year 8. Fractions and percentages are also revisited in HT 4 of Year 8.
<b>Personal Development</b>	<p>Being able to calculate mentally is an extremely important life skill, whether you are working out the cost of a weekly shop or budgeting for a project at work.</p> <p>Probability is used in everyday thinking as you determine the best course of action with a problem.</p>
<b>Key vocabulary</b>	Compensation, addition, subtraction, associative, commutative, partition, multiply, divide, <b>factors</b> , place value, tenths, equal parts, equivalent, calculation, multiple, <b>significant</b> figure, over <b>estimate</b> , under <b>estimate</b> , product, quotient, expression, equal, equality, interpret, efficient, universal set, set, intersection, mutually exclusive, complement, union, impossible, certain, bias, event, fair, multiples, integer, prime, highest common <b>factor</b> , lowest common multiple, prime <b>factor</b> .
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions.</p> <p>Mini white boards will be used to check pupils' understanding on a particular topic.</p> <p>Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.</p>
<b>Resources to use</b>	<p>Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit.</p> <p>Class teachers will set lessons and tasks, some of which will be completed as homeworks.</p> <p>Here are some lessons you may find helpful.</p> <p><a href="https://app.mymaths.co.uk/5789-lesson/mental-addition-and-subtraction">https://app.mymaths.co.uk/5789-lesson/mental-addition-and-subtraction</a></p> <p><a href="https://app.mymaths.co.uk/18-lesson/mixed-calculations-all-numbers">https://app.mymaths.co.uk/18-lesson/mixed-calculations-all-numbers</a></p> <p><a href="https://app.mymaths.co.uk/377-lesson/probability-intro">https://app.mymaths.co.uk/377-lesson/probability-intro</a></p> <p><a href="https://app.mymaths.co.uk/378-lesson/simple-probability">https://app.mymaths.co.uk/378-lesson/simple-probability</a></p> <p><a href="https://app.mymaths.co.uk/1731-lesson/venn-diagrams-1">https://app.mymaths.co.uk/1731-lesson/venn-diagrams-1</a></p>
<b>Enrichment opportunities</b>	<p>Probability experiments:</p> <p><a href="https://nrich.maths.org/6033">https://nrich.maths.org/6033</a></p> <p><a href="https://nrich.maths.org/4304">https://nrich.maths.org/4304</a></p> <p>How do we use probability in real life?</p> <p><a href="https://studiousguy.com/8-real-life-examples-of-probability/">https://studiousguy.com/8-real-life-examples-of-probability/</a></p>



## Year 8 - Half Term 1 - Proportion Reasoning

<b>Prior Learning</b>	Students will build on knowledge of proportion and ratio from KS2 and Year 7. They will be familiar with bar modelling. Students will have experience for multiplying and dividing fractions from Year 6. Multiplication of decimals and integers was covered in Year 7.
<b>What will I learn?</b>	You will learn the meaning of ratio and use bar modelling to share and simplify ratio. The higher strand will start to look at gradient. You will use conversion graphs in various contexts such as currency conversion. You will also look at scale factors in similar shapes. You will then build on your prior knowledge of multiplication and division of fractions. The higher strand will look at mixed numbers too.
<b>Next Steps</b>	Gradient will be studied further in HT 2. Ratio and proportion are the foundations of many topics needed at GCSE. Fractions will be revisited in HT 4 as well as in Year 9 and GCSE.
<b>Personal Development</b>	Scales are used on maps and on building designs. You are very likely to need knowledge of currency conversion when holidaying abroad.
<b>Key vocabulary</b>	Ratio, proportion, <b>factors</b> , circumference, diameter, radius, gradient, linear, <b>estimate</b> , <b>similar</b> ,
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils' understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed as homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/5857-lesson/modelling-ratio">https://app.mymaths.co.uk/5857-lesson/modelling-ratio</a> <a href="https://app.mymaths.co.uk/159-lesson/ratio-dividing-1">https://app.mymaths.co.uk/159-lesson/ratio-dividing-1</a> <a href="https://app.mymaths.co.uk/214-lesson/conversion-graphs">https://app.mymaths.co.uk/214-lesson/conversion-graphs</a> <a href="https://app.mymaths.co.uk/6032-lesson/comparing-mixed-and-improper-fractions-bar-model">https://app.mymaths.co.uk/6032-lesson/comparing-mixed-and-improper-fractions-bar-model</a>
<b>Enrichment opportunities</b>	Ratio puzzles: <a href="https://nrich.maths.org/11685">https://nrich.maths.org/11685</a> <a href="https://nrich.maths.org/6870">https://nrich.maths.org/6870</a> Find live conversion rates for every currency in the world: <a href="https://www.xe.com/currencyconverter/">https://www.xe.com/currencyconverter/</a>



## Year 8 - Half Term 2 - Representations

<b>Prior Learning</b>	Students will build on knowledge of coordinates, graphs and charts from KS2. They will also build on knowledge of probability from Year 7 HT 6.
<b>What will I learn?</b>	You will look at forming algebraic rules for straight lines. Higher strand will also explore non-linear graphs. You will construct and interpret both discrete and continuous data through graphs and charts. Finally you will build on your year 7 knowledge of probability.
<b>Next Steps</b>	In year 9 you will explore gradient and intercept of straight lines in more detail. You will revisit data in Year 8 HT 6. All the topics in this unit will be needed to study Maths and Statistics at GCSE.
<b>Personal Development</b>	The use of graphs or charts are seen in everyday life such as in news stories or comparison websites. The ability to produce graphs and charts are used in many careers (e.g.) in marketing and advertising.
<b>Key vocabulary</b>	origin, parallel, intercept, integer, substitution, equidistant, <b>construct</b> , correlation, , <b>data</b> , outlier
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed at homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/182-lesson/coordinates-2-negative">https://app.mymaths.co.uk/182-lesson/coordinates-2-negative</a> <a href="https://app.mymaths.co.uk/1765-lesson/plotting-graphs-1-lines">https://app.mymaths.co.uk/1765-lesson/plotting-graphs-1-lines</a> <a href="https://app.mymaths.co.uk/358-lesson/scatter-graphs">https://app.mymaths.co.uk/358-lesson/scatter-graphs</a> <a href="https://app.mymaths.co.uk/378-lesson/simple-probability">https://app.mymaths.co.uk/378-lesson/simple-probability</a> <a href="https://app.mymaths.co.uk/356-lesson/two-way-tables">https://app.mymaths.co.uk/356-lesson/two-way-tables</a>
<b>Enrichment opportunities</b>	Graphs of Olympic records: <a href="https://nrich.maths.org/records">https://nrich.maths.org/records</a> Reaction timer experiment: <a href="https://nrich.maths.org/reactiontimer">https://nrich.maths.org/reactiontimer</a> Graphs and charts used in advertising: <a href="https://www.pinterest.co.uk/jonmikelbailey/charts-and-graphs-for-marketers/">https://www.pinterest.co.uk/jonmikelbailey/charts-and-graphs-for-marketers/</a>

## Year 8 - Half Term 3 – Algebraic Techniques

<b>Prior Learning</b>	Students will build on their knowledge of equivalence, solving equations & sequences from Year 7.
<b>What will I learn?</b>	You will explore expanding single brackets and factorising by common factors. Higher strand will expand two binomials. Knowledge of solving equations will be extended with the higher strand looking at unknowns on both sides. You will then compare the similarities and differences of solving inequalities and solving equations. You will then extend your knowledge on sequences and the higher strand will find nth terms of linear sequences. Finally, you will lay the foundations for next terms work by learning about addition and subtraction of indices.
<b>Next Steps</b>	Algebraic manipulation and solving equations will be extended in Year 9 and used extensively in GCSE. Knowledge of indices is needed in next terms work on standard form.
<b>Personal Development</b>	A sound knowledge of algebra is needed in many careers (e.g.) Engineering, computer programming and aerospace. Algebra is often found in many courses at further and higher education level, such as Mathematics A-Level, Engineering apprenticeships and computer programming qualifications.
<b>Key vocabulary</b>	Expression, expand, product, factorise, quadratic inequality, identity, formula, equation, , indices,
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be use to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed at homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/171-lesson/single-brackets">https://app.mymaths.co.uk/171-lesson/single-brackets</a> <a href="https://app.mymaths.co.uk/187-lesson/equations-2-multi-step">https://app.mymaths.co.uk/187-lesson/equations-2-multi-step</a> <a href="https://app.mymaths.co.uk/188-lesson/equations-3-both-sides">https://app.mymaths.co.uk/188-lesson/equations-3-both-sides</a> <a href="https://app.mymaths.co.uk/1740-lesson/inequalities-and-intervals">https://app.mymaths.co.uk/1740-lesson/inequalities-and-intervals</a> <a href="https://app.mymaths.co.uk/238-lesson/arithmatic-sequences">https://app.mymaths.co.uk/238-lesson/arithmatic-sequences</a> <a href="https://app.mymaths.co.uk/153-lesson/indices-1">https://app.mymaths.co.uk/153-lesson/indices-1</a>
<b>Enrichment opportunities</b>	Short problems on powers and roots <a href="https://nrich.maths.org/9324">https://nrich.maths.org/9324</a> Using times table to think about sequences: <a href="https://nrich.maths.org/shifting">https://nrich.maths.org/shifting</a> How algebra is used in careers: <a href="https://www.mathscareers.org.uk/article/practical-applications-algebra/">https://www.mathscareers.org.uk/article/practical-applications-algebra/</a> <a href="https://www.mathscareers.org.uk/article/10-reasons-for-studying-algebra/">https://www.mathscareers.org.uk/article/10-reasons-for-studying-algebra/</a>

## Year 8 - Half Term 4 – Developing Number

<b>Prior Learning</b>	Students will need their knowledge of FDP equivalence from Year 7. Knowledge of indices from last term will be needed for standard index form. Students will extend their basic number skills that were developed in primary and Year 7.
<b>What will I learn?</b>	You will explore fractions and percentages, finding percentage increase and decrease and finding one number as a fraction or percentage of another. You will also look at financial maths. All pupils will learn about standard index form and higher strand will have a basic introduction to negative and fractional indices. Finally, you will revisit your basic number skills in a variety of contexts and problems.
<b>Next Steps</b>	In year 9 and at GCSE you will continue to extend your knowledge of all these topics. You will look at reverse percentages and more complex financial maths. Standard index form will be found in both the GCSE maths and science curriculum.
<b>Personal Development</b>	Financial maths is vital for everyone. You will look at how percentages are used in business and in personal banking (e.g.) savings accounts and loans.
<b>Key vocabulary</b>	Fraction, decimal, percentage, factor, integer, indices, standard index form, reciprocal, metric, perpendicular.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils' understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed as homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/6035-lesson/modelling-percentage-increase-and-decrease">https://app.mymaths.co.uk/6035-lesson/modelling-percentage-increase-and-decrease</a> <a href="https://app.mymaths.co.uk/143-lesson/percentage-change-1">https://app.mymaths.co.uk/143-lesson/percentage-change-1</a> <a href="https://app.mymaths.co.uk/105-lesson/simple-interest">https://app.mymaths.co.uk/105-lesson/simple-interest</a> <a href="https://app.mymaths.co.uk/166-lesson/standard-form-large">https://app.mymaths.co.uk/166-lesson/standard-form-large</a> <a href="https://app.mymaths.co.uk/77-lesson/estimating-introduction">https://app.mymaths.co.uk/77-lesson/estimating-introduction</a>
<b>Enrichment opportunities</b>	Problems using percentages: <a href="https://nrich.maths.org/9325">https://nrich.maths.org/9325</a> Find out about careers in finance: <a href="https://www.mathscareers.org.uk/article/maths-jobs-in-the-finance-sector/">https://www.mathscareers.org.uk/article/maths-jobs-in-the-finance-sector/</a> BBC bitesize (standard index form): <a href="https://www.bbc.co.uk/bitesize/guides/ztg987h/revision/1">https://www.bbc.co.uk/bitesize/guides/ztg987h/revision/1</a> Standard index form game: <a href="https://nrich.maths.org/14530">https://nrich.maths.org/14530</a>

## Year 8 - Half Term 5 – Developing Geometry

<b>Prior Learning</b>	Students will build on KS2 and Year understanding of angle notation and relationships. All students should have a basic knowledge of trapeziums and circles from KS2. Pupils following the higher strand will have met the formulae for area of a trapezium in Year 7.
<b>What will I learn?</b>	You will extend your angle knowledge to include parallel lines and thus solve increasingly complex missing angle problems. The higher strand will develop your understanding of proof. You will also use rulers and a pair of compasses to draw mathematical constructions. Everyone will find the area for trapeziums and circles. You will also explore reflections and enhance your knowledge of triangles and quadrilaterals.
<b>Next Steps</b>	All topics here will be needed at GCSE level. Angles will be visited again in the summer term of Year 9, transformations in the autumn of Year 10 and constructions in summer of Year 10.
<b>Personal Development</b>	Drawing accurate constructions is an aspect of many careers such as in architecture, engineering and surveying. Working out area is used in home DIY projects when working out amounts of paint or flooring needed.
<b>Key vocabulary</b>	acute, obtuse, reflex, right angle, alternate, corresponding, polygon, <b>sector</b> , <b>estimate</b> , <b>significant</b> figure
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed as homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/256-lesson/angle-sums">https://app.mymaths.co.uk/256-lesson/angle-sums</a> <a href="https://app.mymaths.co.uk/258-lesson/angles-in-parallel-lines">https://app.mymaths.co.uk/258-lesson/angles-in-parallel-lines</a> <a href="https://app.mymaths.co.uk/271-lesson/area-of-a-trapezium">https://app.mymaths.co.uk/271-lesson/area-of-a-trapezium</a> <a href="https://app.mymaths.co.uk/270-lesson/area-of-a-circle">https://app.mymaths.co.uk/270-lesson/area-of-a-circle</a> <a href="https://app.mymaths.co.uk/316-lesson/reflecting-shapes">https://app.mymaths.co.uk/316-lesson/reflecting-shapes</a>
<b>Enrichment opportunities</b>	Problems and puzzles about geometry: <a href="https://nrich.maths.org/9341">https://nrich.maths.org/9341</a> How maths is used to design digitally: <a href="https://www.mathscareers.org.uk/video/advancing-the-digital-arts/">https://www.mathscareers.org.uk/video/advancing-the-digital-arts/</a>

## Year 8 - Half Term 6 – Reasoning with Data

<b>Prior Learning</b>	Many of the graphs and charts used in this unit have been seen before in KS2&3. Students have already met median and mean earlier in KS3.
<b>What will I learn?</b>	You will focus on comparing distributions. Misleading graphs will be explored and you will have the opportunity to collect your own data. You will then look at mode and all averages and range to help you interpret data. The higher strand will look at grouped and ungrouped frequency tables.
<b>Next Steps</b>	All topics covered are needed for GCSE and will be revisited in the spring and summer term of Year 9 first.
<b>Personal Development</b>	Exploring misleading graphs can be an important real-life consideration, such as in newspaper articles or advertising campaigns. Displaying data in graphs and charts as well as the use of averages and range is used in many aspects of business (e.g.) marketing and advertising, when ordering new stock in a shop or working out how many people will need to use a public facility (e.g.) a car park.
<b>Key vocabulary</b>	<b>data</b> , frequency, <b>analyse</b> , <b>interpret</b> , continuous, discrete, <b>range</b> , mean, median, mode <b>estimate</b> ,
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils' understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	Pupils can use <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> to help them when studying this unit. Class teachers will set lessons and tasks, some of which will be completed as homeworks. Here are some lessons you may find helpful. <a href="https://app.mymaths.co.uk/343-lesson/types-of-data">https://app.mymaths.co.uk/343-lesson/types-of-data</a> <a href="https://app.mymaths.co.uk/352-lesson/pictograms-and-bar-charts">https://app.mymaths.co.uk/352-lesson/pictograms-and-bar-charts</a> <a href="https://app.mymaths.co.uk/357-lesson/grouping-data">https://app.mymaths.co.uk/357-lesson/grouping-data</a> <a href="https://app.mymaths.co.uk/361-lesson/misleading-graphs">https://app.mymaths.co.uk/361-lesson/misleading-graphs</a> <a href="https://app.mymaths.co.uk/368-lesson/all-averages">https://app.mymaths.co.uk/368-lesson/all-averages</a> <a href="https://app.mymaths.co.uk/373-lesson/mean-of-grouped-data-1">https://app.mymaths.co.uk/373-lesson/mean-of-grouped-data-1</a>
<b>Enrichment opportunities</b>	Problems and puzzles about data: <a href="https://nrich.maths.org/9386">https://nrich.maths.org/9386</a> Learn more about how to collect data: <a href="https://www.leadquizzes.com/blog/data-collection-methods/">https://www.leadquizzes.com/blog/data-collection-methods/</a> <a href="https://www.mathsisfun.com/data/data.html">https://www.mathsisfun.com/data/data.html</a> Misleading graphs in real life: <a href="https://www.statisticshowto.com/misleading-graphs/">https://www.statisticshowto.com/misleading-graphs/</a>

## Year 9 - Half Term 1 – Equations, Formulae, Patterns, Sequences

<b>Prior Learning</b>	This block builds on Year 8 content where students plotted simple straight-line graphs. They will use their prior knowledge of solving equation and inequalities. They will also revisit prime, factors and multiples when testing conjectures.
<b>What will I learn?</b>	Interpret straight-line graphs. Find and use the equation of a straight line. Reduce equations to the form $y=mx+c$ . Compare linear sequences and find a general rule. Extend knowledge of solving equations and inequalities with unknowns on both sides. Change the subject of a formula. Test Conjectures in a wide range of contexts.
<b>Next Steps</b>	At GCSE pupils will need to solve pairs of simultaneous equations, change the subject of complex formula and explore gradients of perpendicular lines.
<b>Personal Development</b>	Use of formula is found in many other areas of the curriculum, for example in science and geography.
<b>Key vocabulary</b>	Parallel, Intercept, equations, linear, gradient, y-intercept, rearrange, inequality, inverse operation, formula
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be use to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	<a href="http://www.vle.mathswatch.co.uk">www.vle.mathswatch.co.uk</a> Clips A11, 12,13,14,18,19,20 <a href="#">Year 9   White Rose Maths</a>
<b>Enrichment opportunities</b>	<a href="#">Equations and Formulae - Stage 3 (maths.org)</a> <a href="#">Equations and Formulae - Stage 4 (maths.org)</a> <a href="#">Patterns and Sequences - Stage 3 (maths.org)</a> <a href="#">Patterns and Sequences - Stage 4 (maths.org)</a>

## Year 9 - Half Term 2 - Constructing in 2 and 3 Dimensions

<b>Prior Learning</b>	Pupils will need their knowledge of 3D shapes from KS2. They will build on constructions studied in Year 7 and 8. They will revisit estimation, rounding and unit conversions.
<b>What will I learn?</b>	Understand the language of common 3D shapes. Identify 2D and 3D shapes. Work out volume and surface area of cuboids, cylinders and prisms. Work out missing lengths when given area/volume. Construct 3D shapes from nets. Construct and use scale drawings. Construct perpendiculars and bisectors. Understand and explore congruency.
<b>Next Steps</b>	At GCSE, pupils will explore volumes of cones, spheres and complex shapes. They will need to find the surface area of any prism. They will also explore the locus of a path.
<b>Personal Development</b>	Accurate constructions are used in many careers, such as, city planning and architecture.
<b>Key vocabulary</b>	Cube/cuboid, cylinder, cone, sphere, pyramid, prism, polygon, net, perpendicular, locus
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	<a href="http://www.vle.mathswatch.co.uk">www.vle.mathswatch.co.uk</a> clip G11,12,15,21,25 & 26 <a href="#">Year 9   White Rose Maths</a>
<b>Enrichment opportunities</b>	<a href="http://maths.org">Construction (maths.org)</a> <a href="http://maths.org">3D Shapes (maths.org)</a> <a href="http://maths.org">Surface Area and Volume (maths.org)</a>



## Year 9 - Half Term 3 – Reasoning with Number

<b>Prior Learning</b>	Number skills, both with and without a calculator, will be revisited here. Fraction, decimal & fraction work for Year 8 will be extended. The Language of financial mathematics, already introduced in Year 7 & 8 is further developed in this unit.
<b>What will I learn?</b>	Knowledge of number extended to include rational and real numbers. Fraction arithmetic revisited. Extend knowledge of HCF and LCM. Revisit standard form. Percentage increase and decrease including percentages over 100%. Find percentages changes. Use multipliers in a variety of contexts. Solve 'reverse percentage' problems. Explore financial maths further.
<b>Next Steps</b>	At GCSE, pupils will need to work with repeated percentage change in a variety of contexts.
<b>Personal Development</b>	Financial maths is important for everyone. Knowledge of bills and bank statements, interest rates and 'best buys' will be useful for the future.
<b>Key vocabulary</b>	Integer, real, rational/irrational, equivalent, multiplier, credit, debit, income, annual, per annum.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils' understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	<a href="http://www.vle.mathswatch.co.uk">www.vle.mathswatch.co.uk</a> Clips N24,27,31,32,36,37,38,39,43,45 <a href="#">Year 9   White Rose Maths</a>
<b>Enrichment opportunities</b>	<a href="#">Place Value, Integers, Ordering &amp; Rounding (maths.org)</a> <a href="#">Factors, Multiples and Primes (maths.org)</a> <a href="#">Fractions, Decimals &amp; Percentages (maths.org)</a>

## Year 9 - Half Term 4 - Reasoning with Geometry

<b>Prior Learning</b>	Knowledge of angle rules will be needed. Fractions and directed numbers will also be revisited. This unit will build on the earlier 'Testing Conjecture' unit and revise constructions, line symmetry and reflection from Year 8.
<b>What will I learn?</b>	Revisit angle rules, including within special quadrilaterals. Find angles using algebraic methods. Use chains of reasoning to evaluate angles. Identify rotational symmetry. Rotate shapes and translate shapes by a given vector. Identify the hypotenuse of a right-angled triangle. Determine whether a triangle is right angled. Calculate missing sides in a right-angled triangle.
<b>Next Steps</b>	At GCSE, pupils will need to develop more complex geometrical proofs. They will need to find the result of a series of transformations. They will explore proofs of Pythagoras' theorem and use it in 3D shapes.
<b>Personal Development</b>	Pythagoras' theorem is used outside the classroom in woodworking, architecture and construction projects.
<b>Key vocabulary</b>	Rotational, symmetry, invariant, translate, vector, hypotenuse, right-angled triangle, square root, parallel, alternate, corresponding.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	<a href="http://www.vle.mathswatch.co.uk">www.vle.mathswatch.co.uk</a> clips G3,5,6,7,13,14,17,18,23,30 <a href="#">Year 9   White Rose Maths</a>
<b>Enrichment opportunities</b>	<a href="#">Angles, Polygons and Geometrical Proof - Stage 3 (maths.org)</a> <a href="#">Angles, Polygons and Geometrical Proof - Stage 4 (maths.org)</a> <a href="#">Attractive Rotations (maths.org)</a> <a href="#">Robotic Rotations (maths.org)</a> <a href="#">Vectors (maths.org)</a> <a href="#">Ladder and Cube (maths.org)</a>

## Year 9 - Half Term 5 - Reasoning with Proportion

<b>Prior Learning</b>	This unit will build on knowledge of ratio, circumference and unit pricing. They will use their prior knowledge on transformations from Years 8 and 9.
<b>What will I learn?</b>	Enlarge shapes by a scale factor, including from a given point. Calculate lengths in similar shapes. Direct proportion problems and graphs, including conversion graphs. Solve ratio problems given the whole or part. Solve simple inverse proportion problems. Revisit 'best buys'. Work on speed, distance & time. Solve problems with density. Work with compound units.
<b>Next Steps</b>	At GCSE, pupils will enlarge shape with negative scale factors. They will explore ratios in right-angled triangles (trigonometry). They will convert between compound measures.
<b>Personal Development</b>	Unit pricing can be used in every day shopping. 'Best buys' helps you find the best deal.
<b>Key vocabulary</b>	Similar, ratio, enlargement, scale factor, corresponding, proportional, non-linear, unit cost, imperial, metric.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be use to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	<a href="http://www.vle.mathswatch.co.uk">www.vle.mathswatch.co.uk</a> Clips G28, R4,5,8,10,11,13 <a href="#">Year 9   White Rose Maths</a>
<b>Enrichment opportunities</b>	<a href="#">Who is the fairest of them all ? (maths.org)</a> <a href="#">Growing Rectangles (maths.org)</a> <a href="#">Fit for Photocopying (maths.org)</a> <a href="#">Speed-time Problems at the Olympics (maths.org)</a> <a href="#">Speeding Boats (maths.org)</a> <a href="#">Ratio, Proportion and Rates of Change - Short Problems (maths.org)</a>

## Year 9 - Half Term 6 - Representations

<b>Prior Learning</b>	Knowledge of frequency trees tables and Venn diagrams. Inequalities will also be used. They will build on their knowledge of probability for years 7 and 8. They will also build on their straight-line graph knowledge.
<b>What will I learn?</b>	Relative frequency. Expected number of outcomes. Probability of independent events. Draw and read from quadratic graphs. Interpret other non-linear graphs. Represent inequalities graphically.
<b>Next Steps</b>	At GCSE, pupils will need to answer complex probability problems. They will need to solve simultaneous equations graphically.
<b>Personal Development</b>	Predicting events such as weather or sporting outcomes.
<b>Key vocabulary</b>	Biased/unbiased, trial, relative frequency, outcome, independent, quadratic, parabola, turning point, simultaneous, satisfy.
<b>How and when will I be assessed?</b>	Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons. Progress will be monitored routinely in a formative way using diagnostic questions and test questions. Mini white boards will be used to check pupils understanding on a particular topic. Short end of block tests will be used alongside longer end of term assessments. All pupils will take a 'core' assessment but there will be opportunities for pupils to show their knowledge on a foundation or higher paper too.
<b>Resources to use</b>	<a href="http://www.vle.mathswatch.co.uk">www.vle.mathswatch.co.uk</a> Clips P2,3,7 and A15,24,27,28 <a href="#">Year 9   White Rose Maths</a>
<b>Enrichment opportunities</b>	<a href="#">Probability - Stage 3 (maths.org)</a> <a href="#">Using Graphs (maths.org)</a> <a href="#">Quadratic Patterns (maths.org)</a> <a href="#">Functions and Graphs - Stage 4 (maths.org)</a>



Maths Years 10 & 11  
Foundation Tier

## Year 10 F - Half Term 1 – Number, Algebra, Graphs Tables & Charts

<b>Prior Learning</b>	<p>Year 7 – Place value &amp; proportion, Application of numbers, FDP, negative numbers, geometric reasoning</p> <p>Year 8 – Algebraic Techniques</p> <p>Year 9 – Reasoning with Algebra, Reasoning with Number</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Use brackets and the hierarchy of operations (not including powers);</li> <li>• Add, subtract, multiply and divide decimals</li> <li>• Round numbers to a given power of 10, decimal places and significant figures;</li> <li>• Estimate answers to calculations by rounding numbers to 1 significant figure;</li> <li>• Use the laws of indices to multiply and divide numbers written in index notation;</li> <li>• Find the product using index notation, find the LCM &amp; HCF of two numbers</li> <li>• Manipulate and simplify algebraic expressions by collecting 'like' terms;</li> <li>• Multiply together two simple algebraic expressions, e.g. <math>2a \times 3b</math>;</li> <li>• Multiply a single number term over a bracket;</li> <li>• Factorise algebraic expressions by taking out common factors.</li> <li>• Substitute numbers in algebraic expressions, involving brackets, powers &amp; negative;</li> <li>• Design, complete and use two-way tables for discrete and grouped data;</li> <li>• Produce and interpret; pictograms, bar charts, vertical line charts, line graphs, histograms with equal class intervals, stem and leaf (including back-to-back);</li> <li>• Construct and interpret pie charts;</li> <li>• Find the mode from a stem and leaf diagrams, bar chart and pie charts;</li> <li>• Draw and interpret scatter graphs;</li> </ul>
<b>Next Steps</b>	<p>Year 10 - Fractions &amp; Percentages, Area &amp; Perimeter 1, Equations, inequalities and sequences, Probability</p> <p>Year 11- Fractions, indices &amp; standard form, Quadratic equations &amp; graphs, More Algebra</p>
<b>Personal Development</b>	<p>A sound knowledge of algebra is needed in many careers for example engineering, computer programming and aerospace. Project managers for developments such as wind farm, use formulae to work out total cost of project.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>estimate, factor, primes, odd formula, substitute, percentage, expand, mode, data, range</p>
<b>How and when will I be assessed?</b>	<p>Pupils progress will be monitored routinely in a formative way using diagnostic questioning and test questions. Teachers should use mini white boards on a regular basis to check pupil understanding of a particular topic.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 79, 80, 81, 33, 34, 35, 93, 94, 95, 15, 62, 63, 70, 71, 72, 73, 74, 86, 120 and 130 are most relevant</p>
<b>Enrichment opportunities</b>	<p>"NRICH" provides challenging extension activities for students. A selection of problems that will develop an understanding of this topic can be found here:</p> <p>Counting Factors - <a href="https://rich.maths.org/countingfactors">https://rich.maths.org/countingfactors</a></p> <p>Think of two numbers - <a href="https://rich.maths.org/thinkoftwonumbers">https://rich.maths.org/thinkoftwonumbers</a></p> <p>Who's the best? - <a href="https://rich.maths.org/whosthebest">https://rich.maths.org/whosthebest</a></p>

## Year 10 F - Half Term 2 – Fractions & Percentages, Equations Inequalities & Sequences

<b>Prior Learning</b>	<p>Year 7 - Application of Numbers, Place Value &amp; Proportion, Directed number &amp; Fraction Thinking</p> <p>Year 8 – Algebraic Techniques</p> <p>Year 9 – Reasoning with Algebra, Reasoning with Number</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Convert between mixed numbers and improper fractions;</li> <li>• Add, subtract, multiply and divide fractions;</li> <li>• Convert between fractions, decimals and percentages;</li> <li>• Order fractions, decimals and percentages, including use of inequality signs.</li> <li>• Express a given number as a percentage of another number;</li> <li>• Calculate amount of increase/decrease;</li> <li>• Use a multiplier to increase or decrease by a percentage</li> <li>• Solve simple equations</li> <li>• Rearrange simple equations;</li> <li>• Substitute into a formula, and solve the resulting equation;</li> <li>• Solve an inequality such as <math>-3 &lt; 2x + 1 &lt; 7</math> and show the solution set on a number line;</li> <li>• Find the <math>n</math>th term for a sequence</li> <li>• Continue a geometric progression and find the term-to-term rule</li> <li>• Continue a quadratic sequence and use the <math>n</math>th term to generate terms;</li> </ul>
<b>Next Steps</b>	<p>Year 10 - Probability</p> <p>Year 11 - Quadratic equations and graphs, More Algebra, Fractions, indices &amp; standard form</p>
<b>Personal Development</b>	<p>Engineers building bridges have to solve many equations to make sure that the bridge can carry the appropriate weight. Inequalities allow us to find a range of solutions, for example, comparing the cost of two different pricing structures.</p> <p>Shop Owners use market research to see which products they should stock. Statisticians use fractions to work out the probability of something not happening. Percentages are used in shops to check your discounts are correct.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>Arithmetic, geometric, <b>function</b>, quadratic, inequality, substitute, <b>expand</b>, linear, <b>mode</b>, <b>range</b>, <b>data</b>, frequency, <b>estimate</b>, <b>percentage</b>,</p>
<b>How and when will I be assessed?</b>	<p>Pupils progress will be monitored routinely in a formative way using diagnostic questioning and test questions. Teachers should use mini white boards on a regular basis to check pupil understanding of a particular topic.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 102, 104, 135, 137, 138, 139, 141, 62, 63, 70, 71, 72, 73, 74, 86, 120 and 130 are most relevant.</p>
<b>Enrichment opportunities</b>	<p>“NRICH” provides challenging extension activities for students. A selection of problems that will develop an understanding of this topic can be found here:  Doughnut Percents - <a href="https://nrich.maths.org/6945">https://nrich.maths.org/6945</a>  Expanding pattern - <a href="https://nrich.maths.org/6800">https://nrich.maths.org/6800</a></p>



## Year 10 F - Half Term 3 – Angles, Averages & Range, Perimeter, Area & Volume 1

<b>Prior Learning</b>	<p>Year 7 – Lines &amp; Angles, Reasoning with Number</p> <p>Year 8 – Developing Geometry, Reasoning with Data</p> <p>Year 9 – Reasoning with Geometry</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Estimate &amp; measure sizes of angles;</li> <li>• Recall the properties and definitions of special types of quadrilaterals and triangles</li> <li>• Recall and use angle facts</li> <li>• Use the sum of the interior angles and exterior angles</li> <li>• Calculate the mean, mode, median and range for discrete data;</li> <li>• Interpret and find a range of averages from frequency tables, bar charts, stem &amp; leaf diagrams</li> <li>• Find the range, modal class, median, and estimate of the mean from a grouped data frequency table;</li> <li>• Find the perimeter of rectangles, triangles, parallelograms and trapezia</li> <li>• Find the area of a triangle, rectangle, trapezium, parallelogram &amp; compound shapes;</li> <li>• Find the surface area of a prism;</li> <li>• Find the volume of a prism, including a triangular prism, cube and cuboid;</li> <li>• Calculate volumes of right prisms and shapes made from cubes and cuboids;</li> <li>• Convert between metric volume measures;</li> </ul> <p>Convert between metric measures of volume and capacity e.g. 1ml = 1cm<sup>3</sup>.</p>
<b>Next Steps</b>	<p>Year 10 – Right angled triangles, Perimeter, area and volume 2</p> <p>Year 11 - Constructions, loci &amp; bearings, Congruence, similarity and vectors</p>
<b>Personal Development</b>	<p>Medical researchers group data to make it easier to deal with then calculate it's average. Measurements are used by builders for example when tiling or during construction etc. Often builders will need to convert between different metric units. Builders also use volumes eg working out the amount of concrete they need for the foundations of a house.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>Polygon, parallel, corresponding, alternate, co-interior, perpendicular, regular, intersect, data estimate, compound, volume,</p>
<b>How and when will I be assessed?</b>	<p>Pupils progress will be monitored routinely in a formative way using diagnostic questioning and test questions. Teachers should use mini white boards on a regular basis to check pupil understanding of a particular topic.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 13, 45, 62 130, 53, 54, 55, 114, 115 and 119 are most relevant.</p>
<b>Enrichment opportunities</b>	<p>“NRICH” provides challenging extension activities for students. A selection of problems that will develop an understanding of this topic can be found here:          Homely angles - <a href="https://nrich.maths.org/7166">https://nrich.maths.org/7166</a>          Choose the mean - <a href="https://nrich.maths.org/12931">https://nrich.maths.org/12931</a>          Perimeter challenge - <a href="https://nrich.maths.org/11119">https://nrich.maths.org/11119</a></p>

## Year 10 F - Half Term 4 – Graphs, Transformations

<b>Prior Learning</b>	Year 7 – Measuring and using geometric notation Year 8 – Working in the cartesian plane Year 9 – Rotation and translation
What will I learn?	<ul style="list-style-type: none"> <li>• Find the coordinates of points identified by geometrical information in 2D (all four quadrants);</li> <li>• Find the coordinates of the midpoint of a line segment; Read values from straight-line graphs for real-life situations;</li> <li>• Draw straight line graphs for real-life situations, including ready reckoner graphs, conversion graphs, fuel bills graphs, fixed charge and cost per unit;</li> <li>• Draw distance-time graphs and velocity-time graphs;</li> <li>• Work out time intervals for graph scales;</li> <li>• Interpret distance-time graphs, and calculate: the speed of individual sections, total distance and total time;</li> <li>• Interpret information presented in a range of linear and non-linear graphs;</li> <li>• Find the centre of rotation, angle and direction of rotation</li> <li>• Describe a rotation fully using the angle, direction of turn, and centre;</li> <li>• Rotate a shape about the origin or any other point</li> <li>• Translate a given shape by a vector;</li> <li>• Describe and transform 2D shapes using single translations on a coordinate grid;</li> <li>• Use column vectors to describe translations</li> </ul>
<b>Next Steps</b>	Year 11 – Loci, Constructions and Bearings
<b>Personal Development</b>	Engineers, Computer Scientists and Statisticians all routinely analyse graphical data from a wide range of sources. Fourier transforms in physics have applications in fibre optics and communication technology.
<b>Key vocabulary(AWL highlighted)</b>	Coordinate, quadrant, real-life graph, gradient, intercept, function, solution, parallel, transformation, rotation, reflection, enlargement, translation, single, combination, scale factor, mirror line, centre of rotation, centre of enlargement, column vector, vector, similarity, congruent, angle, direction, coordinate, describe
<b>How and when will I be assessed?</b>	There will be a summative test at the end of the half term 4 which will assess the student's understanding of units 6, 7, 8 .9 and 10. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.
<b>Resources to use</b>	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 48,49,50 96,97,99 and 148 are the most relevant.
<b>Enrichment opportunities</b>	“NRICH” provides extension activities for students. “Fill me up” provides an interesting extension activity. <a href="https://nrich.maths.org/9005">https://nrich.maths.org/9005</a> <a href="https://www.youtube.com/watch?v=XiAoUDfrar0">The Khan Academy has an informative youtube video</a> <a href="https://www.youtube.com/watch?v=XiAoUDfrar0">https://www.youtube.com/watch?v=XiAoUDfrar0</a>

## Year 10 F - Half Term 5 – Ratio and Proportion, Right Angled Triangles

<b>Prior Learning</b>	Year 7 - Applications of number Year 8 - Ratio and scale Year 9 - Pythagoras, Ratio and proportion problems
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Write ratios in their simplest form;</li> <li>• Write/interpret a ratio to describe a situation;</li> <li>• Share a quantity in a given ratio including three-part ratios;</li> <li>• Solve a ratio problem in context:</li> <li>• Compare ratios;</li> <li>• Write ratios in form <math>1 : m</math> or <math>m : 1</math>;</li> <li>• Write a ratio as a fraction</li> <li>• Solve word problems involving direct and inverse proportion</li> <li>• Recognise when values are in direct proportion by reference to the graph form;</li> <li>• Understand inverse proportion: as <math>x</math> increases, <math>y</math> decreases</li> <li>• Understand, recall and use Pythagoras' Theorem in 2D, including leaving answers in surd form and being able to justify if a triangle is right-angled or not;</li> <li>• Calculate the length of the hypotenuse and of a shorter side in a right-angled triangle, including decimal lengths and a range of units;</li> <li>• Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid;</li> <li>• Calculate the length of a line segment AB given pairs of points;</li> <li>• Know the exact values of <math>\sin \theta</math> and <math>\cos \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math>; know the exact value of <math>\tan \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math>.</li> </ul>
<b>Next Steps</b>	Year 11 – Area and volume 2 An understanding of trigonometry will be developed in some tertiary BTEC courses such as engineering and nautical studies.
<b>Personal Development</b>	Analytical thinking found in Ratio and Proportion is sought after in many careers such as Computing, Engineering and Technology.
<b>Key vocabulary(AWL highlighted)</b>	<b>Ratio, proportion, function</b> , direct proportion, inverse proportion, graphical, linear, right angle, angle, Pythagoras' Theorem, sine, cosine, tan, trigonometry, opposite, hypotenuse, <b>adjacent, ratio</b> , elevation, <b>depression</b> , length
<b>How and when will I be assessed?</b>	There will be a summative test at the end of the half term 6 which will assess the student's understanding of units 11, 12 and 13. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.
<b>Resources to use</b>	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 38,39,41,42,150, 168, 173 are the most useful.
<b>Enrichment opportunities</b>	"NRICH" provides extension activities for students. "Mixing Lemonade" provides an interesting extension activity. <a href="https://nrich.maths.org/6870">https://nrich.maths.org/6870</a> The horizon documentary Fermat's Last Theorem is a fascinating enrichment experience:- <a href="https://www.bbc.co.uk/programmes/b0074rxx">https://www.bbc.co.uk/programmes/b0074rxx</a>

## Year 10 F - Half Term 6 – Probability, Multiplicative Reasoning

<b>Prior Learning</b>	Year 7 – Sets and probability Year 8 – Tables and probability, Multiplicative change Year 9 – Ratio and proportion problems, Probability
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Using <math>1 - p</math> as the probability of an event not occurring where <math>p</math> is the probability of the event occurring;</li> <li>• Find a missing probability from a list or table including algebraic terms;</li> <li>• Find the probability of an event happening using relative frequency;</li> <li>• Estimate the number of times an event will occur, given the probability and the number of trials – for both experimental and theoretical probabilities;</li> <li>• List all outcomes for combined events systematically;</li> <li>• Use and draw sample space diagrams;</li> <li>• Work out probabilities from Venn diagrams</li> <li>• Use union and intersection notation</li> <li>• Find the probability of successive events, such as several throws of a single dice;</li> <li>• Use tree diagrams to calculate the probability of two independent events;</li> <li>• Calculate percentage profit or loss;</li> <li>• Make calculations involving repeated percentage change, not using the formula;</li> <li>• Find the original amount given the final amount after a percentage increase or decrease;</li> <li>• Use compound interest;</li> <li>• Set up, solve and interpret the answers in growth and decay problems</li> </ul>
<b>Next Steps</b>	Students understanding of proportional reasoning will be revisited throughout the course – it is a very influential element of the current GCSE.
<b>Personal Development</b>	Interpreting data from a wide range of sources including the internet is a valuable life skill. Probability will give students an understanding of the dangers of gambling for example.
<b>Key vocabulary(AWL highlighted)</b>	Probability, dependent, independent, conditional, tree diagrams, sample space, outcomes, theoretical, relative frequency, fairness, experimental, ratio, proportion, best value, proportional change, compound measure, density, mass, volume, speed, distance, time, density, mass, volume, pressure, acceleration, velocity, inverse, direct
<b>How and when will I be assessed?</b>	There will be a summative test at the end of the half term 6 which will assess the student's understanding of units 11,12, 13 and 14. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.
<b>Resources to use</b>	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 125,126,142,144,151,164 and 175 are the most relevant.
<b>Enrichment opportunities</b>	<p><a href="#">How likely is it that you will win the National Lottery?</a></p> <p><a href="https://www.youtube.com/watch?v=3bcslt5eL1c">https://www.youtube.com/watch?v=3bcslt5eL1c</a> The miracle of compound interest is a fascinating concept in Economics</p> <p><a href="https://www.youtube.com/watch?v=wf91rEGw88Q">https://www.youtube.com/watch?v=wf91rEGw88Q</a></p>

## Year 11 F - Half Term 1 – Constructions, Loci & Bearings, Quadratic Equations & Graphs

<b>Prior Learning</b>	Year 7 – Constructing Year 8 – Brackets, Equations and Inequalities Year 9 – Algebraic Representations Year 10 – Graphs
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Understand and draw front and side elevations and plans of shapes made from simple solids;</li> <li>• Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid.</li> <li>• Understand congruence, as two shapes that are the same size and shape;</li> <li>• Use straight edge and a pair of compasses to do standard constructions:</li> <li>• Draw and construct diagrams from given instructions, including the following:</li> <li>• Mark on a diagram the position of point <math>B</math> given its bearing from point <math>A</math>;</li> <li>• Given the bearing of a point <math>A</math> from point <math>B</math>, work out the bearing of <math>B</math> from <math>A</math></li> <li>• Multiply together two algebraic expressions with brackets;</li> <li>• Square a linear expression, e.g. <math>(x + 1)^2</math>;</li> <li>• Factorise quadratic expressions of the form <math>x^2 + bx + c</math>;</li> <li>• Factorise a quadratic expression <math>x^2 - a^2</math> using the difference of two squares;</li> <li>• Solve quadratic equations by factorising;</li> <li>• Find the roots of a quadratic function algebraically.</li> <li>• Generate points and plot graphs of simple quadratic functions, then more general quadratic functions;</li> </ul>
<b>Next Steps</b>	Year 11- More algebra The understanding of algebra is encountered in the “A” level mathematics unit Algebra and Function.
<b>Personal Development</b>	Understanding Constructions, Loci and Bearings is an important aspect of mathematics that will be required in many careers such as science, technology, engineering and nautical studies.
<b>Key vocabulary(AWL highlighted)</b>	<b>Construct</b> , circle, arc, <b>sector</b> , face, edge, vertex, two-dimensional, three-dimensional, solid, elevations, congruent, angles, regular, irregular, bearing, degree, bisect, perpendicular, loci, map, scale, plan, region, quadratic, <b>function</b> , solve, <b>expand</b> , <b>factor</b> ise, simplify, expression, graph, curve, factor, coefficient, bracket
<b>How and when will I be assessed?</b>	There will be a summative test at the end of the half term 1 which will assess the student’s understanding of units 15 and 16. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.
<b>Resources to use</b>	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 145,146,147,157,158,160,165, and 166 are the most relevant.
<b>Enrichment opportunities</b>	“NRICH” provides extension activities for students. The following activity “Contact Circles” provides an interesting extension activity <a href="https://nrich.maths.org/6789">https://nrich.maths.org/6789</a> The following youtube clip shows how bearings are used to navigate on our oceans <a href="https://www.youtube.com/watch?v=Qo4U-iR9d5c">https://www.youtube.com/watch?v=Qo4U-iR9d5c</a>

Year 11 F - Half Term 2 – Perimeter, Area & Volume 2, Fractions, Indices & Standard Form	
Prior Learning	Year 7 -FDP Year 8 -Standard Index Form Year 9 -Numbers Year 10 – Fractions and Percentages
What will I learn?	<ul style="list-style-type: none"> <li>Recall the definition of a circle and identify, name and draw parts of a circle including tangent, chord and segment;</li> <li>Recall and use formulae for the circumference and area of a circle</li> <li>Give an answer to a question involving the circumference or area of a circle in terms of <math>\pi</math>;</li> <li>Find radius or diameter, given area or perimeter of circles;</li> <li>Find the perimeters and areas of semicircles and quarter-circles;</li> <li>Calculate perimeters and areas of composite shapes made from circles and parts of circles;</li> <li>Calculate arc lengths, angles and areas of sectors of circles;</li> <li>Find the surface area and volume of a cylinder;</li> <li>Round answers to a given degree of accuracy.</li> <li>Add and subtract mixed number fractions;</li> <li>Multiply and divide mixed number fractions;</li> <li>Find the reciprocal of an integer, decimal or fraction;</li> <li>Convert large and small numbers into standard form and vice versa;</li> <li>Add, subtract, multiply and divide numbers in standard form;</li> </ul>
Next Steps	The understanding of perimeter, area and volume will allow pupils to access spatial concepts in tertiary science engineering and technology subjects.
Personal Development	Understanding Perimeter, Area and Volume is an important aspect of mathematics that will be required in many careers such as science, technology, engineering and nautical studies.
Key vocabulary(AWL highlighted)	Area, perimeter, formula, volume, circle, segment, arc, sector, cylinder, circumference, radius, diameter, pi, sphere, cone, hemisphere, segment, surface mixed fraction, improper fraction, indices, standard form, power, reciprocal, index
How and when will I be assessed?	There will be a summative test at the end of the half term 2 which will assess the student's understanding of units 17 and 18. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.
Resources to use	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 71,73,74,76,83,114,115,116,117,118,119 and 167 are the most relevant.
Enrichment opportunities	"NRICH" provides extension activities for students. The following activity "Cuboids" provides an interesting extension activity <a href="https://rich.maths.org/cuboids">https://rich.maths.org/cuboids</a> Power Countdown - <a href="https://rich.maths.org/6448">https://rich.maths.org/6448</a>

## Year 11 - Half Term 3 - Congruence Similarity & Vectors, More Algebra

<b>Prior Learning</b>	Year 7 – Developing Geometric Reasoning Year 8 – Brackets Equations and Inequalities Year 9 – Construction and congruency Year 10- Algebra
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides;</li> <li>• Solve problems to find missing lengths in similar shapes;</li> <li>• Identify two column vectors which are parallel;</li> <li>• Calculate using column vectors, and represent graphically, the sum of two vectors, the difference of two vectors and a scalar multiple of a vector.</li> <li>• Know the difference between an equation and an identity and use and understand the <math>\neq</math> symbol;</li> <li>• Change the subject of a formula involving the use of square roots and squares;</li> <li>• Answer 'show that' questions using consecutive integers (<math>n, n + 1</math>), squares <math>a^2, b^2</math>, even numbers <math>2n</math>, and odd numbers <math>2n + 1</math>;</li> <li>• Find the equation of the line through two given points;</li> <li>• Recognise, sketch and interpret graphs of simple cubic functions;</li> <li>• Recognise, sketch and interpret graphs of the reciprocal function <math>y = \frac{1}{x}</math> with <math>x \neq 0</math>;</li> <li>• Use graphical representations of inverse proportion to solve problems in context;</li> <li>• identify and interpret the gradient from an equation <math>ax + by = c</math>;</li> <li>• Solve simultaneous equations (linear/linear) algebraically and graphically;</li> </ul>
<b>Next Steps</b>	Congruence , Similarity and Algebra are used in different A level subjects
<b>Personal Development</b>	Congruence, Similarity and Algebra are used in a variety of careers such as engineering and computing
<b>Key vocabulary (AWL highlighted)</b>	Vector, direction, magnitude, scalar, multiple, parallel, collinear, ratio, column vector, congruence, side, angle, compass, construction, shape, length, area, volume, scale factor, enlargement, similar, perimeter, reciprocal, linear, gradient, functions, direct, indirect, estimate, cubic, subject, rearrange, simultaneous, substitution, elimination
<b>How and when will I be assessed?</b>	There will be a summative test at the end of the half term 3 which will assess the student's understanding of units 19 and 20.
<b>Resources to use</b>	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 12b,136,140, 144,161,162 166 and 174 are most relevant
<b>Enrichment opportunities</b>	"NRICH" provides challenging extension activities for students. A selection of problems that will develop an understanding of congruence and similarity can be found here: Same length - <a href="https://nrich.maths.org/11134">https://nrich.maths.org/11134</a> Which is bigger? - <a href="https://nrich.maths.org/7344">https://nrich.maths.org/7344</a>





Maths Years 10 & 11  
Higher Tier

## Year 10 H - Half Term 1 – Number, Algebra

<b>Prior Learning</b>	<p>Year 7 – Place Value , Applications of Number , Directed Numbers , Reasoning with Number , Algebraic Thinking</p> <p>Year 8 – Proportional Reasoning , Developing Number , Algebraic Techniques</p> <p>Year 9 - Reasoning with Number , Reasoning with Proportion , Reasoning with Algebra</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Add, subtract, multiply and divide decimals, Round numbers to the nearest 10, 100, 1000, the nearest integer and significant figures;</li> <li>• Use calculators for all calculations: positive and negative numbers, brackets, powers and roots, four operations.</li> <li>• Find the prime factor decomposition of positive integers – write as a product using index notation, Find the LCM and HCF of two numbers, by listing, Venn diagrams and using prime factors</li> <li>• Add, subtract, multiply and divide numbers in standard form;</li> <li>• Simplify surd expressions (e.g. <math>\sqrt{12} = \sqrt{(4 \times 3)} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}</math>).</li> <li>• Know the difference between a term, expression, equation, formula and an identity;</li> <li>• Substitute numbers into formulae from mathematics and other subjects</li> <li>• Factorise quadratic expressions of the form <math>ax^2 + bx + c</math>;</li> <li>• Set up and solve linear equations</li> <li>• Find the <math>n</math>th term of sequences and solve problems involving sequences</li> </ul>
<b>Next Steps</b>	<p>Year 10 – Fractions, Ratio &amp; Proportion , Multiplicative Reasoning , Graphs , Equations and Inequalities</p> <p>Year 11 – Equations and Graphs , More Algebra , Proportion and Graphs</p>
<b>Personal Development</b>	<p>Numeracy skills will impact pupils financially, socially, and professionally. Its essential from basic things as how many minutes to a train to signing up for a better mortgage deal. Modern technology is based on algebraic skills and these skills are important in careers based on science, engineering, computers, economics, medicine, dentistry, pharmacy and social sciences.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p><b>factor, primes, odd, surd, rational, formula, substitute, index, expand, sequence</b></p>
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons and mini white boards will be used to check understanding. Diagnostic questions will be used to monitor pupil progress in a formative way. There will be a summative test to assess the student’s understanding of unit 1H &amp; 2H.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 66,67,77,78,79,80,82,90,91, 154,188 and 207 are most relevant for Number 1H. Clips 93-104, 133-141,157-163,178-180,190-198 and 209-216 are most relevant for Algebra 2H.</p>
<b>Enrichment opportunities</b>	<p><a href="https://nrich.maths.org/">https://nrich.maths.org/</a> provides challenging extension activities for students. A selection of relevant problems and enrichment activities can be found here:  <a href="https://nrich.maths.org/public/topic.php?group_id=1">https://nrich.maths.org/public/topic.php?group_id=1</a> <b>Number 1H</b>  <a href="https://nrich.maths.org/11649">https://nrich.maths.org/11649</a> <b>Algebra 2H</b></p> <p>BBC has produced excellent series of programs about Numbers and Mathematics.  <a href="https://www.bbc.co.uk/programmes/b0bn9dth">https://www.bbc.co.uk/programmes/b0bn9dth</a> Magic Numbers by Hannah Fry  <a href="https://www.bbc.co.uk/programmes/b00dxjls">https://www.bbc.co.uk/programmes/b00dxjls</a> Story of Maths by Marcus du Sautoy</p>

## Year 10 H - Half Term 2 - Interpreting & Representing Data, Fractions Ratio & Proportion, Angles & Trigonometry

<b>Prior Learning</b>	<p>Year 7 – Place Value and Proportion , Applications of Number , Fraction Thinking, Lines and Angles</p> <p>Year 8 – Representations , Reasoning with Data , Developing Number , Developing Geometry</p> <p>Year 9 – Representations , Reasoning with Number , Reasoning with Geometry</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Design and use two-way tables for discrete and grouped data;</li> <li>• Calculate mean and range, find median and mode from a small data set;</li> <li>• Find the mode, median, range from stem &amp; leaf diagrams, Estimate the mean with grouped data;</li> <li>• Find equivalent fractions and compare the size of fractions;</li> <li>• Add , Subtract , Multiply and divide fractions, including mixed numbers and whole numbers Convert a fraction to a recurring decimal and vice versa;</li> <li>• Classify quadrilaterals and distinguish between scalene, isosceles and equilateral triangles;</li> <li>• Understand and use the angle properties of triangles ,quadrilaterals ,polygons ,parallel lines and find missing angles using the properties of corresponding and alternate angles,</li> <li>• Understand, recall and use Pythagoras’ Theorem in 2D;</li> <li>• Understand, use and recall the trigonometric ratios sine, cosine and tan, and apply them to find angles and lengths in general triangles in 2D figures;</li> </ul>
<b>Next Steps</b>	<p>Year 10 - Probability , Multiplicative Reasoning , More Trigonometry</p> <p>Year 11 – Further Statistics , Proportion and Graphs , Circle Theorems ,</p>
<b>Personal Development</b>	<p>Interpreting Data is an essential life skill and will help you understand the data shown on media and in further studies or careers. Proportional reasoning skills are valuable in a variety of careers e.g. nursing (calculating drug dosages), catering (scaling up recipes).Trigonometry is essential for further studies or careers such as civil engineering and <i>Architecture</i>. <i>Basic angle facts learnt in this unit will be used in construction</i>.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>range, discrete, positive, negative, estimate , percentage, proportion, parallel, corresponding, ratio</p>
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons and mini white boards will be used to check understanding. Diagnostic questions will be used to monitor pupil progress in a formative way. There will be a summative test to assess the student’s understanding of unit 3H, 4H &amp; 5H.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 125-130, 151-53,175-176,185-187,204-205 and 84-92 are most relevant. Clips 45-47, 123,150,217,168,173,195,196,201-203 and 218 are most relevant for Trigonometry.</p>
<b>Enrichment opportunities</b>	<p><a href="https://nrich.maths.org/">https://nrich.maths.org/</a> provides challenging extension activities for students. A selection of problems and enrichment activities can be found here:  <a href="https://nrich.maths.org/public/topic.php?group_id=44">https://nrich.maths.org/public/topic.php?group_id=44</a>  <a href="https://nrich.maths.org/public/topic.php?group_id=35">https://nrich.maths.org/public/topic.php?group_id=35</a>                      The following clip describes trigonometry being used in architecture  <a href="https://www.youtube.com/watch?v=6u3acKlwh6Y">https://www.youtube.com/watch?v=6u3acKlwh6Y</a></p>

## Year 10 H - Half Term 3 - Graphs Unit, Area & Volume

<b>Prior Learning</b>	<p>Year 7 – Algebraic Thinking , Lines and Angles</p> <p>Year 8 – Representations , Algebraic Techniques , Developing Geometry</p> <p>Year 9 – Reasoning with Algebra , Reasoning with Geometry , Constructing in 2 &amp; 3 Dimensions</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Draw and interpret straight-line graphs for real-life situations,</li> <li>• Find the equation of a straight line from a graph in the form <math>y = mx + c</math>;</li> <li>• Explore the gradients of parallel lines and lines perpendicular to each other;</li> <li>• Analyse a straight-line graph and generate equations of lines parallel and perpendicular to it;</li> <li>• Recognize a linear, quadratic, cubic, reciprocal and circle graph from its shape;</li> <li>• Draw circles, Centre the origin, equation <math>x^2 + y^2 = r^2</math>.</li> <li>• Calculate and estimate the area and Perimeter of regular &amp; compound shapes including circles (using circumference = <math>2\pi r = \pi d</math> and area of a circle = <math>\pi r^2</math>)</li> <li>• Calculate arc lengths, angles and areas of sectors of circles;</li> <li>• Find the surface area and volume of prisms &amp; pyramids using the appropriate formulae</li> <li>• Find the upper and lower bounds of calculations involving perimeters, areas and volumes</li> </ul>
<b>Next Steps</b>	<p>Year 10 - Transformations and Constructions , More Trigonometry</p> <p>Year 11 – Equations &amp; Graphs , Proportion and Graphs ,</p>
<b>Personal Development</b>	<p>Interpreting Graphs is an essential life skill and will help you understand the graphs shown on media and in further studies or careers. Knowledge of Area and volume is essential in a variety of careers e.g. construction, architecture and civil engineering.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p><b>Coordinate</b>, axes, 3D, Pythagoras, graph, speed, distance, time, velocity, quadratic, solution, root, <b>function</b>, linear, circle, cubic, <b>approximate</b>, gradient, perpendicular, <b>parallel</b>, equation, Triangle, rectangle, parallelogram, trapezium, <b>area</b>, perimeter, <b>formula</b>, length, width, prism, compound, measurement, polygon, cuboid, volume, nets, isometric, symmetry, vertices, edge, face, circle, segment, arc, <b>sector</b>, cylinder, circumference, radius, diameter, pi, composite, <b>sphere</b>, cone, <b>capacity</b>, hemisphere, segment, frustum, bounds, <b>accuracy</b>, surface area</p>
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons and mini white boards will be used to check understanding. Diagnostic questions will be used to monitor pupil progress in a formative way. There will be a summative test to assess the student's understanding of unit 6H &amp; 7H.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 53-56, 114,117,118,169-172,200,203,216,133,140,143,150,161,195 and 216 are most relevant.</p>
<b>Enrichment opportunities</b>	<p>A selection of relevant problems and enrichment activities can be found here:  <a href="https://nrich.maths.org/9005">https://nrich.maths.org/9005</a>            The following youtube clip develops the understanding of this unit  <a href="https://www.youtube.com/watch?v=qJwecTgce6c">https://www.youtube.com/watch?v=qJwecTgce6c</a></p>

## Year 10 H - Half Term 4 - Transformations & Constructions, Equations & Inequalities

<b>Prior Learning</b>	<p>Year 7 – Lines and Angles , Algebraic Thinking</p> <p>Year 8 – Developing Geometry , Algebraic Techniques</p> <p>Year 9 – Constructing in 2 &amp; 3 Dimensions , Reasoning with Algebra</p> <p>Year 10 - Algebra</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Recognise, describe and distinguish properties that are preserved under particular transformations (rotations, reflections, translations and enlargements)</li> <li>• Use the standard ruler and compass constructions: <ul style="list-style-type: none"> <li>– construct a perpendicular to a given line from/at a given point;</li> <li>– perpendicular bisector of a line segment;</li> </ul> </li> <li>• Construct: <ul style="list-style-type: none"> <li>– a region bounded by a circle and an intersecting line;</li> <li>– a given distance from a point and a given distance from a line;</li> <li>– equal distances from two points or two line segments;</li> <li>– regions which may be defined by ‘nearer to’ or ‘greater than’</li> </ul> </li> <li>• Factorise quadratic expressions in the form <math>ax^2 + bx + c</math> and solve quadratic equations</li> <li>• Use elimination or substitution to solve simultaneous equations;</li> <li>• Solve two linear inequalities in <math>x</math>, find the solution sets and compare them to see which value of <math>x</math> satisfies both solve linear inequalities in two variables algebraically</li> </ul>
<b>Next Steps</b>	<p>Year 11- Equations and Graphs , More Algebra</p>
<b>Personal Development</b>	<p>Mathematical Construction skills are essential for further studies or careers such as civil engineering and <i>Design technology</i>. Analytical thinking found in equation solving and manipulation is sought after in many careers such as Computing, Engineering and Medicine.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>transformation, vector, similar, corresponding, constructions , bearing, Quadratic, inequality, surd, function,</p>
<b>How and when will I be assessed?</b>	<p>Pupils will answer multi-layered questions regularly, which will be marked with written feedback. Pupils will be given verbal feedback during lessons and mini white boards will be used to check understanding. Diagnostic questions will be used to monitor pupil progress in a formative way. There will be a summative test at end of unit 8H &amp; 9H.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 48-50,148,181,182,196, 146 and 124 are most relevant for 8H. Clips 135,137,138,139 and 162 are the most relevant for 9H.</p>
<b>Enrichment opportunities</b>	<p>A selection of relevant problems and enrichment activities can be found here:  <a href="https://nrich.maths.org/8755">https://nrich.maths.org/8755</a> &amp; <a href="https://nrich.maths.org/8481">https://nrich.maths.org/8481</a> &amp; <a href="https://nrich.maths.org/9331">https://nrich.maths.org/9331</a>  The Khan Academy has an informative YouTube video  <a href="https://www.youtube.com/watch?v=XiAoUDfrar0">https://www.youtube.com/watch?v=XiAoUDfrar0</a>  The following you tube clip describes some of the equations that changed the world  <a href="https://www.youtube.com/watch?v=0K-t090uvL4">https://www.youtube.com/watch?v=0K-t090uvL4</a></p>

## Year 10 H - Half Term 5 – Probability, Multiplicative Reasoning

<b>Prior Learning</b>	<p>Year 7 – Reasoning with Number, Place Value and Proportion , Applications of number</p> <p>Year 8 – Representations , Proportional Reasoning ,</p> <p>Year 9 – Representations , Reasoning with Proportion</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Write probabilities using fractions, percentages or decimals;</li> <li>• Draw sample space diagrams and use them for adding simple probabilities;</li> <li>• Know that the sum of the probabilities of all outcomes is 1;</li> <li>• Use union and intersection notation;</li> <li>• Use a tree diagram &amp; Venn diagram to calculate conditional probability;</li> <li>• Express a multiplicative relationship between two quantities as a ratio or a fraction</li> <li>• Represent repeated proportional change using a multiplier raised to a power, use this to solve problems involving compound interest and depreciation;</li> <li>• Understand and use compound measures and:             <ul style="list-style-type: none"> <li>– convert between metric speed measures;</li> <li>– convert between density measures;</li> <li>– convert between pressure measures;</li> </ul> </li> <li>• Use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc (with variables defined in the question);</li> <li>• Recognise when values are in inverse proportion by reference to the graph form</li> </ul>
<b>Next Steps</b>	<p>Year 11 - Proportion and Graphs</p> <p>Statistics constitutes 25% of the A Level Mathematics course and Multiplicative Reasoning is a very influential element of A Level Mathematics.</p>
<b>Personal Development</b>	<p>Many careers require an understanding of statistics including engineering and accountancy. Interpreting data from a wide range of sources including the internet is a valuable life skill. The ability to reason in a multiplicative way is an important analytical skill that will be required in many careers such as science, technology, engineering and mathematics.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>Probability, mutually exclusive, tree diagrams, Venn diagram, <b>Ratio, proportion,</b> unitary, <b>compound</b> measure, <b>volume</b>, , <b>constant</b> of proportionality</p>
<b>How and when will I be assessed?</b>	<p>There will be a summative test at the end of the half term, which will assess the student's understanding of units 10 and 11. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 126,127,175 and 185 are the most relevant for 10H. Clips 142,176, and 199 are the most relevant for 11H.</p>
<b>Enrichment opportunities</b>	<p>"NRICH" provides extension activities for students. There is selection of questions on ratio in the following link <a href="https://nrich.maths.org/9256">https://nrich.maths.org/9256</a>. There is an interesting activity about the risks of eating a bacon sandwich in the following link <a href="https://nrich.maths.org/risky">https://nrich.maths.org/risky</a></p>

## Year 10 H- Half Term 6 – Similarity & Congruence, More Trigonometry

<b>Prior Learning</b>	<p>Year 7 – Lines and Angles , Developing Geometry ,</p> <p>Year 8 – Proportional Reasoning , Developing Geometry</p> <p>Year 9 – Constructing in 2 &amp; 3 Dimensions , Reasoning with Proportion , Reasoning with Geometry</p> <p>Year 10 – Angles and Trigonometry</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments, and to verify standard ruler and pair of compasses constructions;</li> <li>• Use formal geometric proof for the similarity of two given triangles;</li> <li>• Understand the effect of enlargement on angles, perimeter, area and volume of shapes and solids;</li> <li>• Find missing lengths, areas and volumes in similar 3D solids;</li> <li>• Recognise, sketch and interpret graphs of the trigonometric functions (in degrees) <math>y = \sin x</math>, <math>y = \cos x</math> and <math>y = \tan x</math> for angles of any size.</li> <li>• Know the exact values of <math>\sin \theta</math> and <math>\cos \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math> and exact value of <math>\tan \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math> and find them from graphs.</li> <li>• Know the sine and cosine rules, and use to solve 2D problems (bearings).</li> <li>• Apply to the graph of <math>y = f(x)</math> the transformations <math>y = -f(x)</math>, <math>y = f(-x)</math> for sine, cosine and tan functions <math>f(x)</math>.</li> </ul>
<b>Next Steps</b>	<p>Year 11 - Proportional and Graphs.</p> <p>Students who continue their mathematical studies will encounter the subject material in their A Level Mathematics.</p>
<b>Personal Development</b>	<p>The manipulation of shapes in 3d space is a skill that appears in many careers such as CAD design in engineering and technology. Advanced trigonometry is an important element of engineering, architecture and mathematical careers.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>Congruence, length, area, volume, scale factor, similar, frustum, coordinates, transformations, angle</p>
<b>How and when will I be assessed?</b>	<p>There will be a summative test at the end of the half term which will assess the student's understanding of units 12 &amp; 13. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 148,166,171,172 and 181 are the most relevant for 12H. Clips 195,196,201,202 and 203 are the most relevant for 13H.</p>
<b>Enrichment opportunities</b>	<p>"NRICH" provides extension activities for students.</p> <p>"Fit for photocopying" <a href="https://nrich.maths.org/7385">https://nrich.maths.org/7385</a>.</p> <p>"Raising the roof" <a href="https://nrich.maths.org/5614">https://nrich.maths.org/5614</a></p> <p>The following clip describes trigonometry being used in architecture <a href="https://www.youtube.com/watch?v=6u3acklwh6Y">https://www.youtube.com/watch?v=6u3acklwh6Y</a></p> <p>Congruent triangles are described in the following link <a href="https://www.youtube.com/watch?v=IDW1ogTqox8">https://www.youtube.com/watch?v=IDW1ogTqox8</a></p>



## Year 11 H - Half Term 1 – Further Statistics, Equations & Graphs

<b>Prior Learning</b>	<p>Year 7 – Reasoning with Number, Algebraic Thinking ,</p> <p>Year 8 – Representations , Reasoning with Data , Algebraic Techniques ,</p> <p>Year 9 – Representations, Reasoning with Algebra</p> <p>Year 10 – Interpreting &amp; Representing Data ,Probability , Algebra , Equations and Inequalities</p>
What will I learn?	<ul style="list-style-type: none"> <li>• Use statistics found in all graphs/charts in this unit to describe a population;</li> <li>• Construct and interpret cumulative frequency tables/graphs</li> <li>• Compare the mean and range of two distributions, or median and interquartile range, as appropriate</li> <li>• Know the appropriate uses of histograms;</li> <li>• Construct and interpret histograms from class intervals with unequal width;</li> <li>• Use and understand frequency density.</li> <li>• Sketch a graph of a quadratic function, by factorising or by using the formula, identifying roots, <math>y</math>-intercept and turning point by completing the square;</li> <li>• Sketch a graph of a quadratic function and a linear function, identifying intersection points;</li> <li>• Sketch graphs of simple cubic functions, given as three linear expressions;</li> <li>• Represent the solution set for inequalities using set notation, i.e. curly brackets and ‘is an element of’ notation.</li> </ul>
<b>Next Steps</b>	<p>Statistics constitutes 25% of the A Level Mathematics course. Students will revisit Equations and Graphs in the A level Algebra &amp; Sketching Curves unit.</p>
<b>Personal Development</b>	<p>Many careers require an understanding of statistics and graphs including engineering, medicine and accountancy. Interpreting graphical data from a wide range of sources including the internet is a valuable life skill.</p>
<b>Key vocabulary(AWL highlighted)</b>	<p>bias, stratified sample, random, frequency, mode, range, interquartile range estimate, quadratic, function,</p>
<b>How and when will I be assessed?</b>	<p>There will be a summative test at the end of the half term which will assess the student’s understanding of units 14 and 15. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 186,187 and 205 are the most relevant for 14H. Clips 192,211 and 212 are the most relevant for 15H.</p>
<b>Enrichment opportunities</b>	<p>“NRICH” provides extension activities for students.          “Box Plot Match” <a href="https://rich.maths.org/11002">https://rich.maths.org/11002</a>          “Interactive Number Patterns” <a href="https://rich.maths.org/5815">https://rich.maths.org/5815</a>          The following you tube clip describes the statistics of an epidemic  <a href="https://www.youtube.com/watch?v=eHlu6Vi_wxo">https://www.youtube.com/watch?v=eHlu6Vi_wxo</a>          The following clip from the khan academy develops the topic further  <a href="https://www.youtube.com/watch?v=IWigvJcCAJ0">https://www.youtube.com/watch?v=IWigvJcCAJ0</a></p>

## Year 11 H - Half Term 2 – Circle Theorems, More Algebra

<b>Prior Learning</b>	<p>Year 7 – Lines and Angles , Algebraic Thinking</p> <p>Year 8 – Developing Geometry , , Algebraic Techniques</p> <p>Year 9 – Reasoning with Geometry , , Reasoning with Algebra</p> <p>Year 10 - Algebra , Equations and Inequalities</p>
What will I learn?	<p>Recall the definition of a circle and identify (name) and draw parts of a circle, including sector, tangent, chord, segment;</p> <ul style="list-style-type: none"> <li>• Prove and use the facts that: <ul style="list-style-type: none"> <li>– the angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference;</li> <li>– angles in the same segment are equal;</li> <li>– alternate segment theorem;</li> <li>– opposite angles of a cyclic quadrilateral sum to <math>180^\circ</math>;</li> </ul> </li> <li>• Rationalise the denominator involving surds;</li> <li>• Simplify algebraic fractions;</li> <li>• Solve ‘Show that’ and proof questions using consecutive integers (<math>n, n + 1</math>), squares <math>a^2, b^2</math>, even numbers <math>2n</math>, odd numbers <math>2n + 1</math>;</li> <li>• Use function notation and find the inverse of a linear function;</li> </ul>
<b>Next Steps</b>	Students will be expected to be proficient in algebra & Geometric Proof throughout their A level Mathematics studies.
<b>Personal Development</b>	Many careers require an understanding of geometric & algebraic concepts including science related professions, engineering and computing.
<b>Key vocabulary(AWL highlighted)</b>	circumference, perpendicular, <b>coordinate</b> , substitution, , angles, cyclic quadrilateral, denominator, surd, <b>rational</b> , <b>function</b> notation
<b>How and when will I be assessed?</b>	There will be a summative test at the end of the half term which will assess the student’s understanding of units 16 and 17. In mathematics pupil progress will be monitored in a formative way using diagnostic questioning and test questions.
<b>Resources to use</b>	<a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 183 and 184 are the most relevant for 16H. Clips 207,209,210,214 and 215 are the most relevant for 17H.
<b>Enrichment opportunities</b>	<p>“NRICH” provides extension activities for students.</p> <p>Cyclic Quadrilaterals <a href="https://nrich.maths.org/cyclic">https://nrich.maths.org/cyclic</a></p> <p>A question from the World Mathematics championships! <a href="https://nrich.maths.org/13592">https://nrich.maths.org/13592</a></p> <p><a href="https://www.youtube.com/watch?v=kW_WbfYuF3E">Circle Theorem proofs are described in the following link https://www.youtube.com/watch?v=kW_WbfYuF3E</a></p> <p><a href="https://www.youtube.com/watch?v=oa8Vljr5QT0">The book “a brief history of time” describes the equations involved in the modelling of black holes https://www.youtube.com/watch?v=oa8Vljr5QT0</a></p>

## Year 11 H - Half Term 3 – Vectors & Geometric Proof, Proportion & Graphs

<b>Prior Learning</b>	<p>Year 7 – Lines and Angles , Place Value and Proportion ,</p> <p>Year 8 – Representations , Developing Geometry , Proportional Reasoning</p> <p>Year 9 –Reasoning with Geometry, Reasoning with Proportion, Reasoning with Algebra</p> <p>Year 10 – Similarity and Congruence, Algebra , Graphs</p>
<b>What will I learn?</b>	<ul style="list-style-type: none"> <li>• Understand and use vector notation, including column notation, and understand and interpret vectors as displacement in the plane with an associated direction.</li> <li>• Calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors (including algebraic terms).</li> <li>• Find the length of a vector using Pythagoras’ Theorem</li> <li>• Calculate the resultant of two vectors.</li> <li>• Solve geometric problems in 2D where vectors are divided in a given ratio.</li> <li>• Recognise, sketch and interpret graphs of exponential functions <math>y = k^x</math></li> <li>• Interpret and analyse transformations of graphs of functions and write the functions algebraically, e.g. write the equation of <math>f(x) + a</math>, or <math>f(x - a)</math>:             <ul style="list-style-type: none"> <li>• apply to the graph of <math>y = f(x)</math> the transformations <math>y = -f(x)</math>, <math>y = f(-x)</math> for linear, quadratic, cubic functions;</li> <li>• apply to the graph of <math>y = f(x)</math> the transformations <math>y = f(x) + a</math>, <math>y = f(x - a)</math> for linear, quadratic, cubic functions;</li> </ul> </li> <li>• Interpret the gradient of linear or non-linear graphs, and estimate the gradient of a quadratic or non-linear graph at a given point.</li> </ul>
<b>Next Steps</b>	<p>Vectors and Geometry are taught as separate topics in A level maths. Work on geometric reasoning is integral part of all Mechanics units.</p>
<b>Personal Development</b>	<p>Geometrical reasoning is an important skill in construction, architecture &amp; engineering. The interpretation of graphical data is an important life skill, which allows students to interpret data in a considered and logical fashion.</p>
<b>Key vocabulary (AWL highlighted)</b>	<p>multiple, parallel, ratio, column vector , functions, proportion, estimate, area, transformation, constant of proportionality</p>
<b>How and when will I be assessed?</b>	<p>There will be a summative test at the end of the half term, which will assess the student’s understanding of units 18 &amp; 19. Progress will be monitored routinely in a formative way using diagnostic and test questions. Teachers will use mini white boards on a regular basis to check pupil understanding of a particular topic.</p>
<b>Resources to use</b>	<p><a href="http://www.mathswatch.co.uk">www.mathswatch.co.uk</a> is a very useful website for independent study. Clips 174, 219,150,106 are most relevant for 18H. Clips 216,199 and 194 are most relevant for 19H.</p>
<b>Enrichment opportunities</b>	<p>“NRICH” provides challenging extension activities for students</p> <p>Problems on Vectors - <a href="https://nrich.maths.org/8753">https://nrich.maths.org/8753</a></p> <p>“Recipe for toad in the hole” <a href="https://nrich.maths.org/8422">https://nrich.maths.org/8422</a></p>