




# Maths

## Key Stage 4 Framework for Learning

Year 11 2017-2018: I am Creative, Successful, Happy


**Syllabus:**

GCSE Edexcel (9-1) Mathematics

<b>Autumn 1</b>	
<b>Knowledge</b>	<ul style="list-style-type: none"> <li><b>Number and Calculator</b> skills (find the reciprocal of simple numbers/fractions mentally)</li> <li><b>Measures</b></li> <li><b>Accuracy and Bounds</b></li> <li><b>Factors, Multiples and Primes</b> (use prime factorisation to represent a number as a product of its primes using index notation)</li> <li><b>Perimeter and Area</b> (use and apply Pythagoras' theorem to solve problems)</li> <li><b>Indices and Surds</b> (recall that <math>n^0 = 1</math> and <math>n^{-1} = 1/n</math> for positive integers <math>n</math> as well as <math>n^{1/2} = \sqrt{n}</math> and <math>n^{1/3} = \sqrt[3]{n}</math> for any positive number <math>n</math>; simplify surd expressions involving squares (e.g. <math>\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}</math>); simplify surd expressions involving squares)</li> <li><b>Geometry of 2D and 3D Shapes</b></li> <li><b>Angles</b></li> <li><b>Trigonometry</b> (find angles of elevation and angles of depression; know and apply the sine rule <math>a/\sin A = b/\sin B = c/\sin C</math> to find unknown lengths and angles; know and apply the cosine rule <math>a^2 = b^2 + c^2 - 2bc \cos A</math> to find unknown lengths)</li> <li><b>Fractions</b></li> <li><b>Symbols</b></li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>4 Operations</li> <li>Solving multistep worded problems</li> <li>Use of mathematical equipment</li> <li>Reading scales</li> <li>Rounding</li> <li>Recognising parts of a whole</li> <li>Substitution</li> <li>Ability to answer QWC Questions</li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i> Students will complete a mock GCSE examination paper for the new specification 9-1 GCSE during Week 3 of the term. Students will be provided with feedback on their examination in the form of a Personal Learning Checklist and two stars and a wish.</p> <p><i>Marking Point 2</i> Students will be assessed on their written piece of homework which assess their skills in answering a Quality of Written Communication exam question.</p> <p><i>Marking Point 3</i> Students will be assessed on their understanding of a specific topic chosen by their teacher from the topics listed above. Feedback for this will be provided in the form of two stars and a wish.</p>
<b>Cultural enrichment</b>	<p>Parents can encourage students to research cultural Mathematics using a number of websites:</p> <p><b>Mathematical Games from Around the World:</b> <a href="https://nrich.maths.org/8261">https://nrich.maths.org/8261</a></p> <p>Parents can encourage students to download inspiring TED Talks about the magic behind square numbers: <a href="https://www.ted.com/playlists/189/math_talks_to_blow_your_mind">https://www.ted.com/playlists/189/math_talks_to_blow_your_mind</a></p>
<b>Character</b>	<div style="text-align: center;">  <p>QofS – Optimism</p> </div> <p><b>Optimism</b> – students continuously track their own progress throughout the year and reflect on their learning journey so far through the GCSE syllabus. This for many can provide optimism and motivation.</p>





## Autumn 2

<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• <b>Percentages</b></li> <li>• <b>Data Types and Sampling</b></li> <li>• <b>FDP</b></li> <li>• <b>Sequences</b></li> <li>• <b>Equations, Iteration (Quadratic Sequences, Quadratics and Polynomials)</b> (rearrange simple equations; use systematic trial and improvement to find the approximate solution to one decimal place of equations such as <math>x^3 = 29</math>)</li> <li>• <b>Simultaneous Equations</b></li> <li>• <b>Proportion and Rates of Change</b> (express a multiplicative relationship between two quantities as a ratio or a fraction; use compound interest).</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Multiplication</li> <li>• Division</li> <li>• Interpreting data</li> <li>• Pattern recognition</li> <li>• Understanding how ratio/proportion link together</li> <li>• Ability to answer QWC Questions</li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i> Students will complete their College Entry examinations which will inform further set movements in Spring 1 and determine tier of entry.</p> <p><i>Marking Point 2</i> Students will be assessed on their written piece of homework which assess their skills in answering a Quality of Written Communication exam question.</p> <p><i>Marking Point 3</i> Students will be assessed on their understanding of a specific topic chosen by their teacher from the topics listed above. Feedback for this will be provided in the form of two stars and a wish.</p>
<b>Cultural enrichment</b>	<p>A selection of students may have the opportunity to attend a revision day at Manchester University to gain exam key skills.</p> <p>Parents can encourage students to download inspiring TED Talks about the why unknown in Algebra is "x".</p> <p><a href="https://www.ted.com/playlists/189/math_talks_to_blow_your_mind">https://www.ted.com/playlists/189/math_talks_to_blow_your_mind</a></p>
<b>Character</b>	<div style="text-align: center;">  <p>Empathy</p> </div> <p>QoS – Empathy</p> <p><b>Empathy</b> – student-friendly mark schemes are provided and used by peers to assess work and give constructive feedback.</p>



## Spring 1

<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• <b>Surface Area and Volume</b></li> <li>• <b>Collecting and Displaying Data</b></li> <li>• <b>Co-ordinates</b></li> <li>• <b>Transformations</b> (recognise whether a reflection is correct)</li> <li>• <b>Ratio</b> (express a multiplicative relationship between two quantities as a ratio or a fraction)</li> <li>• <b>Probability</b> (use tree diagrams to calculate the probability of two dependent events; use tree diagrams to calculate the probability of two independent events)</li> <li>• <b>Constructions</b> (draw the locus equidistant between 2 points or from a point; produce shapes and paths by using descriptions of loci)</li> <li>• <b>Linear Graphs</b> (know that the gradient of a line is the change in y over change in x; know that a line perpendicular to the line <math>y = mx + c</math>, will have a gradient of <math>-1/m</math>)</li> <li>• <b>Statistical Measures</b></li> </ul> <p><b>Similarity, Congruence and Scale</b> (know that enlargements of 2D shapes produce similar shapes; understand that the ratio of any two sides is constant in similar right-angled triangles).</p>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Drawing and labelling axes</li> <li>• Comparing and interpreting averages and range</li> <li>• Identifying parallel and perpendicular lines</li> <li>• Ability to answer QWC Questions</li> </ul>





<b>Assessment</b>	Students will complete GCSE exams papers every two weeks/weekly dependent on ability. Written feedback will be given on this in the form of a PLC and students will be able to focus their revision efforts on areas of weakness.
<b>Cultural enrichment</b>	A selection of students will be invited to a PiXL Maths conference which will be focused on the key knowledge and understanding required to achieve a Level 5 on either a Foundation or a Higher paper.
<b>Character</b>	  <p>QoS – Creativity &amp; Curiosity  <b>Creativity</b> – students are encouraged to try various pathways to tackle a problem as often there can be numerous ways to reach a solution  <b>Curiosity</b> – students are encouraged to learn independently through PiXL Maths app and Mathswatch.</p>

## Spring 2

<b>Knowledge</b>	<b>Revision based topics tailored to students' specific learning needs as identified through use of PLCs and practice examinations.</b>
<b>Skills</b>	
<b>Assessment</b>	Students will complete GCSE exams papers every two weeks/weekly dependent on ability. Written feedback will be given on this in the form of a PLC and students will be able to focus their revision efforts on areas of weakness.
<b>Cultural enrichment</b>	Parents can encourage students to download inspiring TED Talks on Maths and Physics posing questions such as "What if you hit a baseball moving at the speed of light?" <a href="https://www.ted.com/playlists/189/math_talks_to_blow_your_mind">https://www.ted.com/playlists/189/math_talks_to_blow_your_mind</a>
<b>Character</b>	  <p>QoS – Responsibility &amp; Reflection  <b>Responsibility</b> – students are provided with a choice of over 100 revision topics at afterschool sessions and it is their responsibility to choose an area of weakness to focus on.  <b>Reflection</b> – students are encouraged to reflect on every practice exam performance through the use of an exam PLC.</p>

## Summer 1

<b>Knowledge</b>	<b>Revision based topics tailored to students' specific learning needs as identified through use of PLCs and practice examinations.</b>
<b>Skills</b>	
<b>Assessment</b>	Students will complete GCSE exams papers every two weeks/weekly dependent on ability. Written feedback will be given on this in the form of a PLC and students will be able to focus their revision efforts on areas of weakness.
<b>Cultural enrichment</b>	
<b>Character</b>	  <p>QoS – Practice &amp; Resiliency  <b>Resiliency</b> – students are encouraged to tackle a multitude of A03 style questions in which they have to solve multi-step problems which require resiliency.  <b>Practice</b> – Using their exam PLC, students should identify areas of strength and weakness and use PiXL Maths app and Mathswatch to practise key skills.</p>