

# Maths


## Key Stage 4 Framework for Learning

### Year 10 2017-2018: Successful Foundations

#### Syllabus

GCSE Edexcel (9-1) Mathematics

## Autumn 1

<b>Knowledge</b>	<p><b>Ratio and Proportion</b>          Proportion          Ratio and scales          Percentage Change</p> <p><b>Circles and Constructions</b>          Circumference          Area          Surface area of 3D shapes such as cones, cylinders          Arc length and sector area          Constructions          Loci</p>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Percentage multipliers</li> <li>• Visualising and drawing shapes</li> <li>• Understanding loci</li> <li>• Use of mathematical equipment</li> <li>• Reading maps and scales</li> <li>• Ability to answer problem-solving questions</li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i></p> <p>Week 1/2 - This will be a significant piece of work in their exercise book (highlighted by coloured paper) – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 2</i></p> <p>Week 2/3 Students will be assessed on a Home Learning task which assesses quality of written communication and problem solving skills – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 3</i></p> <p>Week 5/6 - students will undertake an Assessment on Ratio &amp; Proportion or Circles and Constructions. This will cover the key content as outlined in the knowledge section above. Students will be given feedback in the form of two stars and a wish.</p>
<b>Cultural enrichment</b>	<p>Parents can support students with the cultural elements of mathematics by discussing where they use mathematical skills in everyday life. In addition to this, parents can provide references to the mathematics that they come across in websites/magazines and books.</p> <p>Parents can encourage students to download inspiring TED Talks about the magic behind square numbers:</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>QoS – Optimism</p> </div> <p><b>Reflection</b> – Large number of opportunities for peer assessment contained within topic; measuring/drawing constructions and loci. This should initiate discussion between students as to how each drawing can be improved</p>



**Empathy** – Loci rally coach Kagan structure can be used to get students working together. One student helping and one student working, taking turns through differentiated challenges.

## Autumn 2

### Knowledge

#### Factors, Powers and Roots

Factors and multiples  
Prime factor decomposition  
Powers and roots

#### Graphs 1

Drawing straight-line graphs  
Equation of straight line  
Kinematic graphs

### Skills

- Reading axes]
- Drawing and labelling axes
- Ability to answer problem-solving questions

### Assessment

*Marking Point 1*

Week 1/2 - This will be a significant piece of work in their exercise book (highlighted by coloured paper) – feedback will be given in the form of two stars and a wish

*Marking Point 2*

Week 2/3 Students will be assessed on a Home Learning task which assesses quality of written communication and problem solving skills – feedback will be given in the form of two stars and a wish

*Marking Point 3*

Week 5/6 - students will undertake a Progress Test that will encompass everything covered in the Autumn Term. Students will be given feedback in the form of two stars and a wish.

### Cultural enrichment

Parents can encourage students to research cultural Mathematics using a number of websites:

#### Mathematical Games from Around the World:

<https://nrich.maths.org/8261>

Parents can encourage students to download inspiring TED Talks about the magic behind “monster primes”:

[https://www.ted.com/playlists/189/math\\_talks\\_to\\_blow\\_your\\_mind](https://www.ted.com/playlists/189/math_talks_to_blow_your_mind)

### Character



QoFS – Empathy

**Empathy** – Ask The Expert - students can be provided with a mixture of questions to practise by nominating an expert in each field to teach other groups.

**Curiosity** –Pupils can investigate Pythagoras’s theorem by looking at the area of the squares on the three sides of right-angled triangles.

**Empathy** – Ask The Expert - students can be provided with a mixture of questions on negative and fractional indices to practice by nominating an expert in each field to teach other groups.

## Spring 1

### Knowledge



#### Working with 3D Shapes

3D shapes  
Volume of a prism  
Volume and surface area



#### Handling data

Frequency diagrams  
Averages and spread  
Scattergraphs and correlation



	Time series
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Recognising different shapes and parts of shapes</li> <li>• Interpreting data</li> <li>• Understanding a key</li> <li>• Ability to answer problem-solving questions</li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i></p> <p>Week 1/2 - This will be a significant piece of work in their exercise book (highlighted by coloured paper) – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 2</i></p> <p>Week 2/3 Students will be assessed on a Home Learning task which assesses quality of written communication and problem solving skills – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 3</i></p> <p>Week 5/6 - students will undertake an Assessment on Working in 3D shapes or Handling Data. This will cover the key content as outlined in the knowledge section above. Students will be given feedback in the form of two stars and a wish.</p>
<b>Cultural enrichment</b>	<p>Pupils have the opportunity to take part in the Intermediate Maths Challenge.</p> <p>Parents can encourage students to download inspiring TED Talks about the Symmetry, Reality's Riddle:</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="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">   </div> <div> <p>QoS – Creativity &amp; Curiosity</p> <p><b>Curiosity</b> – Opportunity for students to investigate the midpoint of a series of lines. Students encouraged to investigate the coordinates of the lines, look for patterns with the end points to find the general rule to find the midpoint of a line.</p> <p><b>Curiosity</b> – Students may be asked to make sense of the data in its raw form. Once the data is effectively displayed the students will be able to draw more valuable conclusions from the information. This process of discovery should be highlighted and the students curiosity explored.</p> </div> </div>
<b>Spring 2</b>	
<b>Knowledge</b>	<p><b>Calculations 2</b> Calculating with roots and indices Exact calculations Standard Form</p> <p><b>Graphs 2</b> Properties of quadratic functions Sketching functions Real-life Graphs</p>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Reading axes</li> <li>• Drawing and labelling axes</li> <li>• Number skills</li> <li>• Ability to answer problem-solving questions</li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i></p> <p>Week 1/2 - This will be a significant piece of work in their exercise book (highlighted by coloured paper) – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 2</i></p> <p>Week 2/3 Students will be assessed on a Home Learning task which assesses quality of written communication and problem solving skills – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 3</i></p> <p>Week 5/6 - students will undertake a Progress Test that will encompass everything covered in the Autumn and Spring Term.</p>



<b>Cultural enrichment</b>	<p>Pupils have the opportunity to take part in the Intermediate Maths Challenge.</p> <p>Parents can encourage students to download inspiring TED Talks about the how Statistics fool juries:  <a href="http://www.mathsinsider.com/ted-ed/">http://www.mathsinsider.com/ted-ed/</a></p>
<b>Character</b>	<p>QofS – Responsibility &amp; Reflection</p> <div style="display: flex; align-items: center;">   </div> <p><b>Reflection</b> – large number of opportunities for peer assessment contained within topics; has your partner substituted values into an equation and plotted the correct graph?</p> <p><b>Responsibility</b> – Can pupils apply their skills to contextual questions e.g. working backwards to find out the length of a shape given the surface area or volume.</p> <p><b>Reflection</b> – Discussing the pros and cons of solving equations in different ways, including the use of graphical solutions.</p>


## Summer 1

<b>Knowledge</b>	<p><b>Pythagoras and Trigonometry</b>          Pythagoras' Theorem          Trigonometry</p> <p><b>Vectors</b></p> <p><b>Combined Events (Probability) cont'd</b>          Sets          Possibility Spaces          Tree Diagrams</p>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Use of language in probability</li> <li>• Manipulation of equations</li> <li>• Ability to answer problem-solving questions</li> <li>• </li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i></p> <p>Week 1/2 - This will be a significant piece of work in their exercise book (highlighted by coloured paper) – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 2</i></p> <p>Week 2/3 Students will be assessed on a Home Learning task which assesses quality of written communication and problem solving skills – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 3</i></p> <p>Week 5/6 - students will undertake an Assessment on Pythagoras and Trigonometry, Vectors or Probability. This will cover the key content as outlined in the knowledge section above. Students will be given feedback in the form of two stars and a wish.</p>
<b>Cultural enrichment</b>	<p>Parents can encourage students to download inspiring TED Talks about the beauty of data visualization:  <a href="http://www.mathsinsider.com/ted-ed/">http://www.mathsinsider.com/ted-ed/</a></p>
<b>Character</b>	<p>QofS – Practice &amp; Resiliency</p> <div style="display: flex; align-items: center;">   </div> <p><b>Practice</b> – Students should progress through more challenging exam questions on combined events in Probability.</p> <p><b>Practice</b> – Using their exam PLC, students should identify areas of strength and weakness and use Doodle/Mathswatch to practise key skills.</p>

## Summer 2

<b>Knowledge</b>	<p><b>Combined Events (Probability) cont'd</b></p> <p><b>Sequences</b>          Sequence Rules          Nth term          Special Sequences</p>
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	<p>Quadratic Sequences</p> <p><b>Ratio and Proportion</b> Compound Units Direct Proportion Inverse Proportion Growth and Decay</p>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Percentage multipliers</li> <li>• Ability spot patterns</li> <li>• Manipulation of equations</li> <li>• Ability to answer problem-solving questions</li> </ul>
<b>Assessment</b>	<p><i>Marking Point 1</i></p> <p>Week 1/2 - This will be a significant piece of work in their exercise book (highlighted by coloured paper) – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 2</i></p> <p>Week 2/3 Students will be assessed on a Home Learning task which assesses quality of written communication and problem solving skills – feedback will be given in the form of two stars and a wish</p> <p><i>Marking Point 3</i></p> <p>Week 5/6 - students will undertake a Progress Test that will encompass everything covered in the Autumn, Spring and Summer.</p>
<b>Cultural enrichment</b>	<p>Parents can encourage students to download inspiring TED talks about the properties of Fibonacci sequences.</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>	 <p>QofS – Motivation</p> <p><b>Motivation</b> – Students relate their learning to Bloom’s Taxonomy. For example; can students <u>remember</u> what makes a good question? Can students <u>apply</u> this knowledge to an exam question? Can students <u>evaluate</u> somebody else’s question? Can students <u>create</u> their own investigation?</p> <p><b>Motivation</b> – Students can design their own exam question and mark scheme based on tree diagrams.</p>