



# Maths

## Key Stage 3 Framework for Learning

### Year 8 2016-2017: Creative Foundations

#### Autumn 1

<p><b>Knowledge</b></p>	<ul style="list-style-type: none"> <li>• <b>Number</b> (use the order of operations with brackets, including in more complex calculations; use inverse operations; check a result by considering if it is of the right order of magnitude; find the reciprocal of simple numbers/fractions mentally)</li> <li>• <b>Calculator skills</b></li> <li>• <b>Standard Form</b></li> <li>• <b>Indices and Surds</b> (know all the squares of numbers less than 16 and be able to know the square root given the square number; extend the patterns by using the index law for division established for positive power answers, to show that any number to the power of zero is 1)</li> </ul>
<p><b>Skills</b></p>	<ul style="list-style-type: none"> <li>• Addition</li> <li>• Subtraction</li> <li>• Multiplication</li> <li>• Division</li> <li>• Mental methods</li> <li>• Solving multi step word problems</li> </ul>
<p><b>Assessment</b></p>	<p>Students' classwork will be assessed on their understanding of Number, Calculator, Standard Form and Indices (and Surds) learning objectives outlined in the knowledge section above. This will be done through teachers marking students' books and feedback will be given in the form of two stars and a wish. Students will also be assessed on their mathematical rigour and marking in books will reflect this.</p> <p>Students will be assessed on their written piece of homework. Feedback will be given in their books.</p> <p>Towards the end of the term (Week4/5), students will undertake a topic review test for Number, Calculator, Standard Form and Indices (and Surds) . 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> <p>All assessed tasks will be differentiated for Yellow, Green and Blue learners.</p>
<p><b>Reward &amp; enrichment</b></p>	<p>There is a Maths leaders club that runs every Tuesday night. This involves puzzles, games and critical thinking skills.</p> <p>Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as: Can you write the distance from Earth to the sun in meters in standard form? This aims to inspire curiosity and develop communication skills for future class discussion.</p>
<p><b>Character</b></p>	<p><b>QofS – Curiosity</b> <b>CV – Self-Help and Self Responsibility</b></p> <ul style="list-style-type: none"> <li>• <b>Curiosity</b> – Investigating number properties, e.g. does a number always get bigger when it is multiplied? (Standards unit lesson – always/sometimes/never true activity).</li> <li>• <b>Curiosity</b> – Pupils can investigate the order of operations through the use of brackets on their calculator. Pupils can investigate surds by looking into operations with square numbers.</li> <li>• <b>Self Help and Self Responsibility</b> – Can pupils apply their skills to contextual questions e.g. working out the area of a shape when a length is given in surd form or contextual questions involving lengths written in standard form etc. Skill ladders can be used for pupils to assess which level they are at, e.g. Can I estimate an answer to a calculation by rounding to 1 significant figure? What skills do I need to focus on?</li> <li>• <b>Self-help</b> – students are encouraged to consult their books or their buddies prior to asking a teacher for help, encouraging independent learning.</li> <li>• <b>Self-responsibility</b> – students are asked to take responsibility for their revision by being given topic lists for their exam and using this to guide their revision.</li> </ul> 



## Autumn 2

<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• <b>Proportion and Rates of Change</b> (set up equations to show direct proportion; use expressions of the form <math>y \propto x</math>; use compound interest; express a multiplicative relationship between two quantities as a ratio or a fraction)</li> <li>• <b>Surface Area and Volume</b></li> <li>• <b>Collecting Data</b></li> <li>• <b>Vectors</b> (understand and use vector notation; add and subtract vectors)</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Division</li> <li>• Multiplication</li> <li>• Addition</li> <li>• Recognising different shapes and parts of shapes</li> </ul>
<b>Assessment</b>	<p>Students' classwork will be assessed on their understanding of Proportion, Rates of Change, Surface Area and Volume, Collecting Data (and Vectors) learning objectives outlined in the knowledge section above. This will be done through teachers marking students' books and feedback will be given in the form of two stars and a wish.</p> <p>Students will be assessed on their written piece of homework. Feedback will be given in their books.</p> <p>During Week 5 and 6, students will complete an end of term progress test that will cover many elements of what they have learnt this term. This exam will inform set movements for Spring term.</p> <p>All assessed tasks will be differentiated for Yellow, Green and Blue learners.</p>
<b>Reward &amp; enrichment</b>	<p>There is a Maths leaders club that runs every Tuesday night. This involves puzzles, games and critical thinking skills.</p> <p>Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as: Why is the Earth not a perfect sphere? This aims to inspire curiosity and develop communication skills for future class discussion.</p>
<b>Character</b>	<p><b>QofS – Creativity and Motivation</b>  <b>CV –Solidarity and Social Responsibility</b></p> <ul style="list-style-type: none"> <li>• <b>Creativity and Motivation</b> – Students can design their own exam question and mark scheme based on surface area/volume</li> <li>• <b>Motivation</b> – Students relate their learning to Bloom's Taxonomy. For example; can students <i>remember</i> what makes a good question? Can students <i>apply</i> this knowledge to an exam question? Can students <i>evaluate</i> somebody else's question? Can students <i>create</i> their own investigation?</li> </ul> <p><b>Creativity</b> - Students can investigate where vectors are used in real life and how this can link to learning.</p> 

## Spring 1

<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• <b>Co-ordinates</b> (generate four quadrant coordinate pairs of simple linear functions)</li> <li>• <b>Transformations</b> (recognise whether a reflection is correct)</li> <li>• <b>Displaying Data</b> (interpret simple diagrams and charts; interpret simple pie charts; group data, where appropriate in equal class intervals; use information provided to complete a two-way table; construct a simple (no boundary data) frequency table with given equal class intervals for continuous data)</li> <li>• <b>Functions</b></li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Reading axes</li> <li>• Visualising and drawing shapes</li> <li>• Interpreting data</li> </ul>
<b>Assessment</b>	<p>Students' classwork will be assessed on their understanding of Co-ordinates, Transformations, Displaying Data and Functions learning objectives outlined in the knowledge section above. This will be done through teachers marking students' books and feedback will be given in the form of two stars and a wish. Students will be assessed on their written piece of homework. Feedback will be given in their books.</p> <p>Towards the end of the term (Week4/5), students will undertake a topic review test for Co-ordinates, Transformations, Displaying Data and Functions. 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> <p>All assessed tasks will be differentiated for Yellow, Green and Blue learners.</p>
<b>Reward &amp; enrichment</b>	<p>There is a Maths leaders club that runs every Tuesday night. This involves puzzles, games and critical thinking skills.</p> <p>Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as: Why does the UK Government do a census every ten years? This aims to inspire curiosity and develop</p>



<p><b>Character</b></p>	<p>communication skills for future class discussion.</p> <p><b>QofS – Resiliency and Practice</b> <b>CV – Equality and Equity</b></p> <ul style="list-style-type: none"> <li>• <b>Practice</b> – Large number of opportunities for peer assessment contained within topic; particularly when finding coordinates on a coordinate grid. Students can create their own pair of Cartesian coordinates for a partner to find, then swap and answer each other's questions.</li> <li>• <b>Resilience</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.</li> <li>• <b>Resilience</b> – Students should be asked to investigate Pythagoras' theorem to calculate the length of various diagonals which join two points both within the classroom and from exterior structures.</li> <li>• <b>Equality</b> - students are encouraged at all times demonstrate equality and equity through respect within the classroom.</li> </ul> 
<h2 style="background-color: #004a99; color: white; padding: 5px;">Spring 2</h2>	
<p><b>Knowledge</b></p>	<ul style="list-style-type: none"> <li>• <b>Ratio</b> (express a multiplicative relationship between two quantities as a ratio or a fraction)</li> <li>• <b>Probability</b> (use the vocabulary of probability; apply the property that the probabilities of an exhaustive set of outcomes sum to 1; identify all possible mutually exclusive outcomes of a single event; identify all mutually exclusive outcomes for two successive events with two outcomes in each event; write probabilities in words, fractions, decimals and percentages; find and justify probabilities based on equally likely outcomes in simple contexts; 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> (use straight edge and compasses to construct the mid point and perpendicular bisector of a line segment; draw the locus equidistant between 2 points or from a point; produce shapes and paths by using descriptions of loci)</li> <li>• <b>Sets</b></li> </ul>
<p><b>Skills</b></p>	<ul style="list-style-type: none"> <li>• Division</li> <li>• Multiplication</li> <li>• Use of mathematical equipment</li> <li>• Use of language of probability</li> </ul>
<p><b>Assessment</b></p>	<p>Students' classwork will be assessed on their understanding of Ratio, Probability, Constructions and Sets learning objectives outlined in the knowledge section above. This will be done through teachers marking students' books and feedback will be given in the form of two stars and a wish.</p> <p>Students will be assessed on their written piece of homework. Feedback will be given in their books.</p> <p>During Week 2 and 3, students will complete an end of term progress test that will cover many elements of what they have learnt this term. This exam will inform set movements for Summer term.</p> <p>All assessed tasks will be differentiated for Yellow, Green and Blue learners.</p>
<p><b>Reward &amp; enrichment</b></p>	<p>There is a Maths leaders club that runs every Tuesday night. This involves puzzles, games and critical thinking skills.</p> <p>Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as: What is the chance of winning the national lottery? How do they work it out? How would the probability be affected if we had more or less numbers? This aims to inspire curiosity and develop communication skills for future class discussion.</p>
<p><b>Character</b></p>	<p><b>QofS – Optimism and Empathy</b> <b>CV – Openness and Honesty</b></p> <ul style="list-style-type: none"> <li>• <b>Empathy</b> – 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.</li> <li>• Plenty of opportunity for peer and self-assessment throughout all topics.</li> <li>• <b>Optimism</b> – pupils can investigate theoretical v experimental probability, e.g. horse race, flipping coins.. Pupils can watch parts of Derren Brown – 'the special's'. The video is about placing bets on horseracing and consecutively winning.</li> <li>• <b>Empathy</b> – pupils can show that they are understanding the outcomes of an experiment by reflecting on whether they would win a game or place a bet.</li> <li>• <b>Openness</b> - during lesson time, teachers encourage students to share their work through the use of a visualiser and discuss their solutions with the rest of the class.</li> <li>• <b>Honesty</b> – students are encouraged to be honest when self-assessing their/others' work.</li> </ul> 



<b>Summer 1</b>	
<b>Knowledge</b>	<ul style="list-style-type: none"> <li><b>Recap of Symbols</b> (simplify algebraic expressions by collecting like terms; construct expressions from worded descriptions, using addition and subtraction)</li> <li><b>Linear graphs</b> (plot the graphs of simple linear functions in the form <math>y = mx + c</math> in four quadrants; know that the gradient of a line is the change in <math>y</math> over change in <math>x</math>)</li> <li><b>Statistical Measures</b></li> <li><b>Further Graphs</b></li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Drawing and labelling axes</li> <li>Interpreting data</li> <li>Comparing and interpreting averages</li> <li>Simplifying</li> <li>Identify parallel and perpendicular lines</li> </ul>
<b>Assessment</b>	<p>Students' classwork will be assessed on their understanding of Symbols, Linear Graphs, Statistical Measures, Further Graphs learning objectives outlined in the knowledge section above. This will be done through teachers marking students' books and feedback will be given in the form of two stars and a wish. Students will be assessed on their written piece of homework. Feedback will be given in their books.</p> <p>Towards the end of the term (Week4/5), students will undertake a topic review test for Symbols, Linear Graphs, Statistical Measures, Further Graphs. 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> <p>All assessed tasks will be differentiated for Yellow, Green and Blue learners.</p>
<b>Reward &amp; enrichment</b>	<p>There is a Maths leaders club that runs every Tuesday night. This involves puzzles, games and critical thinking skills.</p> <p>Pupils have the opportunity to take part in the Junior Maths Challenge.</p> <p>Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as Can you find a bar chart or another chart from a recent newspaper and describe what it shows? This aims to inspire curiosity and develop communication skills for future class discussion.</p>
<b>Character</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 80%;"> <p><b>QofS – Reflection</b> <b>CV – Caring for Others and Self-Help</b></p> <ul style="list-style-type: none"> <li><b>Reflection</b> – Improvements in accuracy of plotting or sketching linear graphs and improvements in ease at tackling more difficult questions should be pointed out when students practise.</li> <li><b>Empathy/Reflection</b> – plenty of opportunities for students to peer/self assess for example writing a star star wish after completing a cumulative frequency question.</li> <li><b>Reflection</b> - Can students use mathematical symbols to describe a scenario? e.g. Emma has <math>x</math> sweets, Pete has five more than Emma, write an expression for the number of sweets Pete has.</li> <li><b>Reflection</b> – provide students with incorrect work for them to identify the common misconceptions, e.g. <math>a \times a</math> is the same as <math>2a</math>.</li> <li>The students are reflecting on misconceptions which will help them to reflect on their own work in the future.</li> </ul> </div> <div style="width: 15%; text-align: center;">  </div> </div>
<b>Summer 2</b>	
<b>Knowledge</b>	<ul style="list-style-type: none"> <li><b>Similarity, Congruence and Scale</b> (Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS); identify congruent shapes; know that enlargements of 2D shapes produce similar shapes; understand that the ratio of any two sides is constant in similar right-angled triangles)</li> <li><b>Formulae</b></li> <li><b>Circle Theorems</b> (know that the perpendicular distance from a point to a line is the shortest distance to the line; solve problems involving angles, triangles and circles)</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Reading maps and scales</li> <li>Division</li> <li>Multiplication</li> <li>Substitution</li> </ul>
<b>Assessment</b>	<p>Students' classwork will be assessed on their understanding of Similarity, Congruence, Scale, Formulae and Circle Theorems learning objectives outlined in the knowledge section above. This will be done through teachers marking students' books and feedback will be given in the form of two stars and a wish.</p> <p>Students will be assessed on their written piece of homework. Feedback will be given in their books.</p>



	<p>During Week 2 and 3, students will complete an end of year progress test that will cover elements of what they have learnt across the curriculum throughout the year. This exam will inform set movements for Year 9.</p> <p>All assessed tasks will be differentiated for Yellow, Green and Blue learners.</p>
<b>Reward &amp; enrichment</b>	<p>There is a Maths leaders club that runs every Tuesday night. This involves puzzles, games and critical thinking skills.</p> <p>Paper-based homework investigations will include elements of cultural Mathematics.</p> <p>Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as: If the base and height of a triangle are doubled (enlarged by a scale factor of 2), how much bigger is the area? This aims to inspire curiosity and develop communication skills for future class discussion.</p>
<b>Character</b>	<p>QofS – Responsibility CV – Democracy</p> <ul style="list-style-type: none"> <li>• <b>Responsibility</b> – students can investigate the relationships between length, area and volume of similar shapes and come up with a link between them.</li> <li>• <b>Responsibility</b> – make students aware, perhaps through a skills ladder, of the learning journey and progress that they can make in their learning outcomes.</li> <li>• <b>Responsibility</b> – students should take the opportunity to be responsible for their work, e.g. self-assessing their work through substitution of answers.</li> </ul> <div data-bbox="1334 640 1501 763" style="float: right; border: 1px solid black; padding: 5px; text-align: center;">  </div>