Maths
Key Stage 4 Framework for Learning
Year 9 2017-2018: Happy Foundations

Syllabus:
GCSE Edexcel (9-1) Mathematics

Autumn 1	
Knowledge	**Calculations** Place Value Rounding Error Intervals Adding and Subtracting Multiplying & Dividing **Expressions** Simplifying Expressions Indices Expanding & Factorising Algebraic Fractions*
Skills	• Addition • Subtraction • Multiplication • Division • Mental Methods • Solving multistep word problems • Use of mathematical equipment • Estimation • Rounding • Ability to mathematically reason
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 an Assessment on Calculations or Expressions. 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.
Cultural enrichment	• Home learning will encourage pupils to develop their cultural enrichment, by researching key elements of the course. Questions will be posed such as: Is zero a positive or negative number? This aims to inspire curiosity and develop communication skills for future class discussion. 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 square numbers: https://www.ted.com/playlists/189/math_talks_to_blow_your_mind

Character	 QofS – Optimism **Optimism** Lots of questions at different levels, enabling students to challenge themselves by moving onto harder questions independently. **Optimism** – Opportunities for both peer and self-evaluation. Teacher should provide success criteria for students to mark against.

Autumn 2

Knowledge	**Angles** Angles and Lines Triangles & Quadrilaterals Congruence & Similarity Angles in Polygons Pythagoras Trigonometry **Handling Data** Sampling Organising data Representing Data Averages & Spread
Skills	• Pattern recognition • Substitution • Multiplication • Division • Addition • Subtraction • Ability to mathematically reason • Recognising different parts of shapes and parts of shapes • Use of mathematical equipment • Ability to mathematically reason
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* PROGRESS TEST 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 download inspiring TED Talks about the magic behind "monster primes": 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 practice by nominating an expert in each field to teach other groups. **Empathy/Motivation** – Team games involving maps, scale and measuring will allow development of motivational skills in teams. Having to cooperate with others will allow development of empathy. **Reflection** – Discussing the pros and cons of each type of displaying data and choosing the most appropriate chart.

Spring 1	
Knowledge	**Fractions, decimals and percentages** Decimals & Fractions Fractions and Percentages Calculations with Fractions Fractions, Decimals & Percentages **Formulae & Functions** Substituting into Formulae Using Standard Formulae Equations, Identities and Functions Expanding and Factorising 2
Skills	• Recognising parts of a whole • Division • Multiplication • Simplifying • Substitution • Ability to mathematically reason
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 an Assessment on Fractions, Decimals and Percentages. 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.
Cultural enrichment	Parents can encourage students to download inspiring TED Talks about the Maths around Origami: https://www.ted.com/playlists/189/math_talks_to_blow_your_mind
Character	  QofS – Creativity & Curiosity **Curiosity** – Investigating number properties, e.g. does a number always get bigger when it is multiplied? (can use standards unit lesson – always/sometimes/ never true activity). **Creativity** – reverse questioning, i.e. the answer is a half, what could the question be? Provide pupils with an equation and ask students to build a story around it.
Spring 2	
Knowledge	**Formulae & Functions cont'd** See Spring 1 **Working in 2D** Measuring Lengths and Angles Area of 2D Shapes Transformations 1 Transformations 2
Skills	• Simplifying • Substitution • Ability to mathematically reason
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 and Spring Term.
Cultural enrichment	• High ability Year 9 students are invited to participate in 6 Royal Institute Masterclasses. • Pupils have the opportunity to take part in the Edge Hill University Maths Competition. This runs after school and provides students with challenging questions that connect a number of mathematical topics. Students work together in teams to come up with a solution, using their creativity to impress the judges. • Students have the opportunity to attend after school revision sessions in the lead-up to the exams. Day of week TBC. Parents can encourage students to download inspiring TED Talks about the Symmetry, Reality's Riddle: https://www.ted.com/playlists/189/math_talks_to_blow_your_mind
Character	 QofS – Responsibility & Reflection **Reflection** – large number of opportunities for peer assessment contained within topics; has your partner completed/described a transformation correctly? **Reflection** – provide students with incorrect work for them to identify the common misconceptions, e.g. enlarging a shape always makes it bigger. **Curiosity** – students can investigate the relationships between length, area and volume of similar shapes.

Summer 1

Knowledge	**Probability** Probability Experiments Expected outcomes Theoretical Probability Mutually Exclusive Events **Measure & Accuracy** Estimation & Approximation Calculator Methods Measure & Accuracy
Skills	• Use of mathematical equipment • Reading scales • Estimation • Rounding • Ability to mathematically reason
Assessment	Students' classwork will be assessed on their understanding of the Percentages, FDP and Linear 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 a QWC homework, which assesses their quality of written communication when answering exam questions. Feedback will be given in their books. Towards the end of the term (Week4/5), students will undertake a topic review test for Percentages, Data Types and Sampling. 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. All assessed tasks will be differentiated for Yellow, Green and Blue learners.
Cultural enrichment	• Pupils have the opportunity to take part in the Intermediate Maths Challenge. • Pupils have the opportunity to take part in the Edge Hill University Maths Competition. This runs after school and provides students with challenging questions that connect a number of mathematical topics. Students work together in teams to come up with a solution, using their creativity to impress the judges.

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Character	  QofS – Practice & Resiliency **Pratice** –Provide pupils with a stimulus, such as a sample space and ask them to design questions based on it. **Resilience** – Providing students with difficult questions on Venn Diagrams, they develop resilience and have the opportunity to create their own. **Motivation** – pupils can play games associated with probability. They can link this to their learning. **Curiosity** – Use of questioning will help students think about whether a unit of measurement is sensible or use estimation. Invite students to create scenarios giving sensible units of measurement in real life context.
Summer 2	
Knowledge	**Measure and Accuracy cont'd** See Summer 1 **Equations and Inequalities** Solving linear equations Quadratic Equations Simultaneous equations Approximate Solutions using Iteration Inequalities
Skills	• Simplifying • Substitution • Ability to form and solve equations • Ability to mathematically reason
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, Spring and Summer Term.
Cultural enrichment	• **Pupils have the opportunity to take part in the Intermediate Maths Challenge.** • **Students in teams who have been successful in the Edge Hill University Challenge in round 1 and 2 have the opportunity to present their findings to a panel of University professionals during a trip to Edge Hill.** • **Students have the opportunity to attend after school revision sessions in the lead-up to the exams. Day of week TBC.** **Parents can encourage students to download inspiring TED talks about the properties of Fibonacci sequences:** **https://www.ted.com/playlists/189/math_talks_to_blow_your_mind**
Character	 QofS – Motivation

	Motivation – Playing games to maintain interest and encourage team-work, use of Mathematical Team Games, such as "Old Older, Oldest" to develop skills for simultaneous Equations. **Creativity** – Giving the students points of graphs and asking them to come up with the equation. Giving the students a graph and asking them to design a set of questions based on that graph. Producing revision posters of this topic will consolidate learning and show creativity in the way they express their understanding. **Curiosity** – 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.