

Mathematics Department: Yearly Overview Plan 2019-2020

Year 8- Students will be expected to master the objectives highlighted in yellow. This ranges from grade 1-3

Unit	Learning Outcomes <i>Students will...</i>			Real World Application	Assessment Methods
F1. Integers and place value	F1.1A/F1.1D	Use and order positive and negative integers	1	<p>Students must choose and create one of the following products for their Integer Project.</p> <ol style="list-style-type: none"> Integer Brochure Integer Poster Integer PowerPoint Presentation Cartoon Strip Children's book 	<p>In mathematics, students' ability will be assessed as a whole against the IGCSE 9-1 framework, rather than assessed in each individual unit.</p> <p>Students will be continually assessed against the IGCSE 9-1 framework throughout the year, through both formative and summative assessment:</p> <p>Formative assessment Ongoing Classwork Homework Use of fpsmaths.com</p> <p>Summative assessment Term 1/2/3 Year 8 Topic assessments after each unit (Number, Algebra, Geometry and Statistics)</p> <p><i>IGCSE Assessment 1</i> Foundation tier graded assessment paper Week commencing 24th November 2019</p> <p><i>IGCSE Assessment 2</i> Foundation tier graded assessment paper</p>
	F1.1B, F1.3B	Understand place value	1		
	F1.8A	Round integers to 10	1		
	F1.1E/F1.1C	Addition, subtraction, multiplication and division	2		
	F1.1F	Understand order of operations	2		
F2. Decimals	CODE	F2. Decimals	GRADE	<p>For many of us, our very first job consists of some GCSE level, lower wage job.</p> <p>This type of job is a great way to earn spending money, but could we support ourselves making a minimum wage? What does it actually cost to live by ourselves, pay all of our own bills, and buy all of our own food? In this project, students will compute yearly</p>	
	F1.3C	Order decimals	1		
	F1.3D	Convert a decimal to a fraction or percentage	2		
	F1.8B	Round to significant figures or decimal places	2		
	F1.8D	Estimation	3		
	F1.11A	Use a scientific calculator	3		
F1.8C	Identify upper and lower bounds	4			

expenses for a person who lives a modest lifestyle. Then they will prepare their own budget.

Week commencing 23rd February 2020

Year 8 PTM
Computer based assessment in mathematics
May 2020

F3. Special numbers, powers and root

F1.1G	Identify odd, even, prime numbers, factors & multiples	2
F1.4A	Identify square numbers and cube numbers	2
F1.1H	Identify prime factors, common factors and common multiples	3
F1.4B	Calculate squares, square roots, cubes and cube roots	3
F1.4D	Product of prime factors	4
F1.4E	Find the HCF and LCM	4

When people use the internet to access information, sometimes that information is personal to that person. It could be photos from a holiday, bank account information, social media accounts, purchased items or tickets and much more. Have you ever noticed the little padlock symbol that sometimes appears to the left of a web address? This means the page is encrypted and protected from anyone else accessing the information. Have you ever wondered how this encryption actually works? It's all to do with numbers ...!

IGCSE Assessment 3
Foundation/Higher tier graded assessment paper
Week commencing 23rd May 2020

F4. Fractions F7. Arithmetic of fractions	<table border="1"> <thead> <tr> <th>CODE</th> <th>F4/F7. Fractions</th> <th>GRADE</th> </tr> </thead> <tbody> <tr> <td>F1.2A</td> <td>Equivalent and simplifying fractions</td> <td>2</td> </tr> <tr> <td>F1.2D/F1.2C</td> <td>Order fractions and fraction of an amount</td> <td>2</td> </tr> <tr> <td>F1.2E</td> <td>Express a number as a fraction of another number</td> <td>2</td> </tr> <tr> <td>F1.2G</td> <td>Convert a fraction to a decimal or percentage</td> <td>2</td> </tr> <tr> <td>F1.2B</td> <td>Use mixed numbers & improper fractions</td> <td>3</td> </tr> <tr> <td>F1.2F</td> <td>Add and subtract fractions</td> <td>4</td> </tr> <tr> <td>F1.2I/F1.2H</td> <td>Multiply and divide fractions</td> <td>4</td> </tr> </tbody> </table>	CODE	F4/F7. Fractions	GRADE	F1.2A	Equivalent and simplifying fractions	2	F1.2D/F1.2C	Order fractions and fraction of an amount	2	F1.2E	Express a number as a fraction of another number	2	F1.2G	Convert a fraction to a decimal or percentage	2	F1.2B	Use mixed numbers & improper fractions	3	F1.2F	Add and subtract fractions	4	F1.2I/F1.2H	Multiply and divide fractions	4		<p>In the last 100 years, it has been a myth that fractions are difficult and have no connection to the real world. Students task is to prove everyone wrong and create a presentation to convince others of how easy fractions are. Students must be an expert in your topic and their project must incorporate technology as well as real life examples.</p>
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receive 7 cents for every dollars worth of goods that they sell. The advantage of working on commission is a potential for a high income if sales are good. Of course, if few sales are made, the income is poor. Some examples of commission work are real estate sales, car sales, insurance sales, stereo equipment sales, and investments, just to name a few. In this project, students will investigate how much money is made by different people working on commission.

F6. Ratio and proportion

F1.7A	Simplifying ratio	3
F1.7B	Divide a quantity in a given ratio	3
F1.7D/F1.7C	Direct proportion with unknown quantities (recipes etc)	3
F1.7E/F1.10A	Worded problems for ratio/proportion	4
F1.10B	Mass, length, area, volume and capacity	4
F1.10C	Calculations including time, money and converting currencies	5

Most people who cook know how to double or triple a recipe. But how would you make a recipe for 150 people? In this project, students will take your favourite Spaghetti Bolognese recipe and adjust it so that you are able to feed 150 people. Also, students will calculate the cost of the ingredients for this gigantic meal.

F8. Set language, notation and Venn diagrams	F1.5A	understand the definition of a set	3	Venn diagrams are used in many areas of life where we need to categorize or group items
	F1.5B	use set notation for elements	3	
	F1.5C	understand universal sets & empty sets	4	
	F1.5D	understand and use the complement of a set	4	
	F1.5E	use Venn diagrams to represent sets	4	
	F6.3D	find probabilities from a Venn diagram	5	
F9. Indices and standard form	F1.4C	Index laws for integers	4	We use standard form to show very large numbers and very small numbers when we are measuring things. For example, measuring the diameter of the Sun, measuring the length of a microorganism
	F1.9A	Standard form basics	5	
F10. Algebraic manipulation	F2.1A/ F2.1B / F2.3A/ F2.3B	Write expressions and equations	1	When a teacher says that word 'Algebra', usually students worry and start to panic that they will find it too difficult. Algebra is just the use of letters and other symbols to represent numbers. Because they represent numbers, we can add, subtract, multiply, divide and everything else with algebra, just by following the instructions. During this unit you will learn the basic rules of Algebra and look at how problems in our day to day lives can be represented with Algebra.
	F2.1C	Multiplying and dividing algebraic terms	3	
	F2.1D	use index laws with algebraic terms	3	
	F2.2B	Collecting like terms- adding and subtracting	3	
	F2.2C	Expanding a single bracket	3	
	F2.2D	Factorise into a single bracket	3	

F11. Expressions, formulae and rearranging formulae	F2.2A / F2.3C	Substitute values into expressions and formulae	2	You are to create your own overseas vacation using a range of sources and websites to gain an understanding of the Mathematical processes involved with travelling. You will also look at Geographical skills in order to learn about the culture of your destination.
	F2.3D/ F2.3E	Write formulae & expressions from real-life contexts	4	
	F2.3F	change the subject of a formula	5	
F12. Linear equations and inequalities	F2.8A	understand and use inequality symbols	3	When going to College there are a lot of costs to consider, in this project we will investigate how we can compare different financial implications by setting up equations. We will then consider how grants/ scholarships can affect our decisions.
	F2.8B	Show inequalities on a number line	3	
	F2.4B	set up simple linear equations from given data	4	
	F2.8C	solve linear inequalities with one variable	4	
	F2.4A	solve linear equations	5	
F13. Sequences	F3.1A	Find terms of a sequence using the term-to-term rule	2	There are many different ways for you to get around the UAE; you could use a bus, the Metro, a taxi, an Uber or even air transport! All these different methods of transportation vary greatly in cost. In this project, you will investigate the different costs of some these methods of transport and the companies associated with them. How
	F3.1B	Find terms of a sequence using the nth term	3	
	F3.1C	Find the nth term of arithmetic sequences	4	

				does the cost of them link to sequences? Then you will create an outline of your preferred method of transportation and why is costs what it does.
F14. Real life graphs	F3.3A	Interpret linear and non-linear graphs	5	Linear relationships can be modelled on a graph, for example profit and sales.
F15. Linear graphs	F3.3B/ F3.3C	plot and locate coordinates in the four quadrants	1	Applications that use mapping work based on the cartesian plane co-ordinates. An air traffic controller must know the location of every aircraft in the sky within certain geographic boundaries. In order to describe where each aircraft is situated, coordinates are assigned to each vehicle in the air
	F3.3D	Use coordinates to find missing points in shapes	2	
	F3.3F	draw and interpret straight line conversion graphs	3	
	F3.3E	Find the coordinates of the midpoint of line	4	
	F3.3I	Plot linear graphs	4	
	F3.3G	find the gradient of a straight line	4	
	F2.8D	Represent linear inequalities on a graph	4	
	F3.3H	Find the equation of a straight line	5	
	F2.8E	Identify a region on a graph defined by linear inequalities	5	
F16. Quadratic equations and graphs	F2.2E	Expand double brackets	4	A ball is thrown straight up, from 3 m above the ground, with a velocity of 14 m/s. When does it hit the ground? https://www.mathsisfun.com
	F2.2F	Factorise quadratic expressions	5	
	F2.7A	Solve quadratic equations by factorization	5	
	F3.3J	Draw quadratic functions	5	

</algebra/quadratic-equation-real-world.html>

F17. Simultaneous equations

F2.6A	Solve linear simultaneous equations	5
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Students will find out the better deal when renting a car. One company charges \$30 per day and 40 cents per mile. Another company charges \$45 per day and 30 cents a mile. If they can determine when the costs are the same, students can then know which would be the better deal. So you set m = total miles to be driven and c = total cost for each company. Then $c = 30 + 0.40m$ and $c = 45 + 0.30m$. It follows that $30 + 0.40m = 45 + 0.30m$ and $m = 150$. The cost of each company would be the same at 150 miles. Under 150 miles, the first company is cheaper. Above 150 miles, the second company is cheaper.

F18. Measures, bearings and scale drawings

F4.4A/ F4.4C	Read scales of measures and make estimates	1
F4.4B	Use the 24-hour and the 12-hour clock	1
F4.1A	Types of angles	1
F4.5A	Measure and draw lines to the nearest millimetre	2

Many of us have, at one time or another, considered visiting Alaska. It is clear that if one were to drive to any part of Alaska; it would require a lot of driving time. How much time? In this project, you will plan a trip to Alaska. You will plan a route; calculate the

F4.11B/F4.5 C	Use maps and scale drawings to solve problems	2
F4.4D/F4.4E	Measure an angle including 3 figure bearings	2
F4.9A/F4.10 A	Metric conversion (length/area/volume)	3

total highway miles, the total driving time, and the cost of the trip.

F19. Symmetry, shapes, parallel lines and angle facts

F4.10A	Name 2D/3D shapes	1
F4.10B	Use face, edge and vertex with 3D shapes	2
F4.3A	Lines of symmetry/Order of rotational symmetry	2
F4.1D	Types of triangles and their properties	2
F4.1B	Intersecting, parallel lines and angles on a straight line	3
F4.1C	Angles in a triangle	3
F4.2B/ F4.2C	Quadrilateral facts and properties	3
F4.7A	Problem solving with shapes with informal reasons	3

In this project you will investigate different types of angles as well as various triangles and quadrilaterals while creating your very own mini golf course!

You have just been chosen to design a mini golf course for the World Tour Championship, Dubai.

Your course needs to be challenging for the players and it can have bunkers, mountains, forests, lava lakes obstacles etc.

Once you have designed your holes, you need to show how a professional player would hit (using angles) to bounce off the walls to get it in.

F20. Polygons	F4.2A	Recognise and give the names of polygons	2	<p>You are going to investigate the geometry of polygons. For thousands of years, people living at northern latitudes had no idea how high up the Aurora Borealis was located. Before the advent of photography in the 1880's, auroral observers tried to determine the height of aurora by the method of triangulation. One of the earliest of these measurements was made by the French scientist Jean-Jacques d'Ortous de Mairan between 1731 and 1751.</p>
	F4.2D	Interior and exterior angles of regular polygons	4	
	F4.2E	Angle sum of polygons	4	
F21. Compound measures	F4.4F	Speed, distance and time	4	<p>Sheik Zayed Road has a speed limit of 100km/h its length is 558.4 km how long would it take to get from one side to the other.</p>
	F4.4G	Speed, density and pressure	4	
F22. Perimeter, area and volume	F4.9C	Area of triangles and rectangles	2	<p>There are two areas to think about designing your dream apartment. The floor plan of all the rooms, the shapes and sizes. And how you would like to decorate the apartment-what paint you would like to use, the flooring. In this project, you will have to design your apartment layout but you have got a budget of</p>
	F4.9B	Perimeter of shapes	3	
	F4.9D	Area of parallelograms and trapezia	4	
	F4.10C	Surface area of triangles/rectangles	5	

				10,000AED- can you stick to your budget?
F23. Circles and cylinders	F4.6A/F4.6B	Label a circle and understand the properties	2	Vehicles can all travel at the same speed and for the same length of time. However, some vehicles will reach their final destination quicker than others. This is due to the size of their wheels. In this project, you will be choosing three different vehicles and working out the different number of rotations each vehicle makes and why.
	F4.9E	Area and circumference of circles/semicircles	4	
	F4.10D	Surface area of a cylinder	5	
	F4.10E	Volume of prisms	5	
F24. Transformations	F5.2G/F5.2F	Translate a shape using left/right	2	Real life examples of enlargements/reductions are: architectural perspective, scaled house plans and machinery parts' design, enlarging and reducing images on a computer
	F5.2B/F5.2A/ F5.2C	Rotate a shape about a point through a given angle	3	
	F5.2E/F5.2D	Use a mirror line to reflect and construct	3	
	F5.2H	Translate a shape using column vectors	3	
	F5.2L/F5.2J/ 5.2K	Enlarge a shape given the scale factor given a centre	4	
	F5.2M	Identify and give complete descriptions of transformations	4	
F25. Pythagoras' theorem and trigonometry	F4.8A	Pythagoras' theorem in two dimensions	4	When builders are building extensions they measure the walls and the diagonal to ensure that the set out is at a right angle.
	F4.8B/F4.8C	Trigonometry in two dimensions	5	

F26. Similarity and congruence in 2D

F4.2F/4.2G	Congruent shapes	3
F4.11A	Similar shapes using lengths	4

Similar shapes are used when creating scale models and actual buildings, in the design process. UAE real life- the UAE flag has to have the right proportion of red, green and black which is really important for flag day when we see lots of different sized flags

F27. Constructions

F4.5B	Construct 2D shapes using a mathematical equipment	3
F4.5D	Perpendicular bisector of a line and bisect an angle	4

Bisecting angles and other geometrical constructs are used by architects when they are drafting the designs of buildings.

F28. Graphical representation of data

F6.1A	use different methods of presenting data	1
F6.1B	use data in tables to construct statistical diagrams	2
F6.1C	interpret statistical diagrams	3

In the last 10 years we have heard a lot about the possibility of a "greenhouse effect" causing a global temperature increase. The greenhouse effect is the result of increased levels of carbon dioxide (CO2) in the atmosphere which could possibly be causing 2 increased global temperatures. In this project, you will analyse temperature data for your local region and an outside region, and look for a possible trend.

F29. Statistical measures	F6.2A/ F6.2B	calculate the mean, median, mode & range for discrete data	2	<p>Many people who are sports fans have a favourite team, and a favourite athlete. Our favourite athlete usually has extraordinary athletic ability, but even these outstanding athletes eventually retire. Time takes its toll on all of us, even our favourite athletes. In this project you will find the average ago at which your favourite athlete's performance started to decline.</p>
	F6.2D	identify the modal class for grouped data	3	
	F6.2C	calculate an estimate for the mean for grouped data	4	
F30. Probability	F6.3A	understand the language of probability	2	<p>In this case, event A is the event you have this disease, and event B is the event that you test positive. Thus $P(B \text{ not } A)$ is the probability of a "false positive": that you test positive even though you don't have the disease.</p> <p>https://www.math.hmc.edu/unfacts/ffiles/30002.6.shtml</p>
	F6.3B	understand and use the probability scale	2	
	F6.3C	understand and use estimates of probability	3	
	F6.3F	list all the outcomes for events in a systematic way	3	
	F6.3G	estimate probabilities from previously collected data	3	
	F6.3H	calculate the probability of the event not happening	3	
	F6.3J	understand and use the term 'expected frequency'	3	
	F6.3I	use the addition rule in probability	4	
	F6.3E	Find the probability of an event from a sample space	4	