Core Maths Scheme of Learning

3 lessons	INTRO – TALKING ABOUT MATHS	Contexts/problems
Objectives **and** **Common misconceptions**	• Use of spreadsheets, tables and data charts • Use of mathematical context • Apply previous knowledge from GCSE to solve problems including area, equations of lines, similar shapes and Pythagoras • Apply knowledge of fractions and percentages to solve problems involving personal finance • Critically analyse data charts • Discuss mathematical thinking with others to explain potential methods and solutions	*What do you notice?* *What do you wonder?* <u>Short tasks:</u> Where's the maths in that? https://amsp.org.uk/resource/wheres-the-maths-in-that Missing numbers Voting Running your own car Running smart Maps and measuring Ice cream cones
Tier 2 Vocab	Discuss, analyse, use, explain, compare, similar, different, convert	
Tier 3 Vocab	Mathematical thinking, critically analyse, data, primary, secondary, formulae, average, axis, scale, box plot, bar chart, compound bar chart, pie chart, frequency, pictograph, infographic, irregular shape, area, perimeter, surface area, ratio, percentage	
Homework	Source two data charts amd critically analyse them Present a given data set in the most appropriate way	
Careers links	Graphic designer https://www.unifrog.org/student/careers/keywords/graphic-designer	
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Cross-curricular links	PE (running smart) PHSE (running your own car, voting) Geography (maps and measuring)	

9 lessons	FERMI ESTIMATION	Contexts/problems
Objectives **and** **Common misconceptions**	• Solve open mathematical problems • Use real-life contexts • Apply prior mathematical knowledge e.g. estimations, measures • Understand the difference between Fermi and other estimation techniques • Represernt a mathematical situation graphically • Select appropriate mathematical techniques • Interpret results in context • Evaluate methods and solutions, understand there may be more than one possible solution/method • Make considered assumptions	<u>Short tasks:</u> How much water does a hamster need per day? How people in this photo? How far do you walk in a lifetime? How many people can stand in Trafalgar Square? How many cells in your hand? How many jelly beans would fit in a double decker bus?
Specification links	E1.1, E1.2, E1.3, E1.4, E2.1	
Tier 2 Vocab	Assumption, apply, evaluate, interpret, consider, appropriate, solution, method	

Tier 3 Vocab	Estimate, Fermi, measure, modelling, data handling cycle, area, density, formulae, volume, distance, scale, population conjecture	Longer tasks: Can everyone in the world fit onto the Isle of Wight? Are you using enough sun cream? How many lorries are needed to stock a supermarket? How many schools in England?
Homework	Develop Fermi exam question for another student (must also have worked solution) Fermi past-examination questions	
Career links	Mechanical engineer https://www.unifrog.org/student/careers/keywords/mechanical-engineer	
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Cross-curricular links	Biology/ Applied Science (how much water does a hamster need, how many cells in your hand) Geography (how many people can you fit in Trafalgar Square, can you fit everyone in the world on Isle of Wight)	
Assessment	Past exam questions Verbal discussions/questioning	
12 lessons	**PERSONAL FINANCE**	**Contexts/problems**
Objectives **and** **Common misconceptions**	• Find approximate solutions to problems in financial contexts • Set up, solve and interpret solutions to financial problems • Calculate percentage of amounts, percentage change, percentage increase/decrease and reverse percentages • Know and understand income tax and national insurance rates • Convert between currencies (including examples which involve commission or buy/sell rates) • Understand the concept of APR and AER and how these apply to mortgages, credit, loans etc • Compare financial products using mathematical workings • Calculate financial aspects of mortgages using iteration • Apply indices laws to RPI, CPI and inflation • Discuss mathematical thinking with others to explain potential methods and solutions • Use of written information, spreadsheets, tables and data charts • Substitute numerical values into formulae, spreadsheets and financial expressions • Apply and interpret limits of accuracy, specifying simple error intervals due to truncation or rounding • Use of mathematical context	Short tasks Money Diaries https://natwest.mymoneysense.com/young-adults/money-diaries/ Payday low down https://natwest.mymoneysense.com/young-adults/videos/payday-lowdown/ Tax the rich http://www.magicalmaths.org/smsc-starter-tax-the-rich-an-animated-fairy-tale/ Budgetting for a (career of their choice) Basket Case http://quibans.blogspot.com/2022/02/quibans-104-basket-case.html Longer tasks Cost of living crisis Can I afford university? This or that House prices
Specification links	F1.1., F1.2, F1.3, F1.4 F2.1, F2.2, F2.3, F2.4, F2.5 F3.1, F3.2 F4.1 F5.1 F6.1 F7.1, F7.2, F7.3, F7.4	
Tier 2 Vocab	Currency, spreadsheet, formula, percentage, increase, decrease, method, solution, explain, discuss, apply, interpret, solve, calculate, finance, mortgage, loan, interest, compare	

Tier 3 Vocab	Rounding, truncation, reverse percentage, APR, AER, compound interest, simple interest, limits of accuracy, VAT, inflation, commission, iteration, expression, substitution,	
Homework	Create budget with given outgoings dependent on future career choice (use of Unifrog to research expected wage) Compare two or more financial options to find the most suitable Past GCSE exam questions relating to percentages, iteration etc https://padlet.com/lastcenturion1985/CoreMathsAQA/wish/533715047 Past Core Maths exam questions relating to personal finance	
Career links	Financial accountant https://www.unifrog.org/student/careers/keywords/financial-accountant	
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Cross-curricular links	Guidance – careers (finance)	
Assessment	Past exam questions In-class mock assessment of learning – Fermi and personal finance Verbal discussions/questioning	
15 lessons	**ANALYSIS OF DATA**	**Contexts/ problems**
Objectives **and** **Common misconceptions**	• Know the difference between primary and secondary data • Understand the data handling cycle • Understand different forms of sampling and the benefits and limitations of each method • Construct statistical diagrams to represent data – grouped, continuous and discrete data • Interpret statistical diagrams • Critically analyse statistical diagrams, media reports • Calculate averages including mean, median, mode, range, interquartile range • Interpret numerical measures and use these to compare data sets	Short tasks: UK population statistics Random Penguins https://teacher.desmos.com/activitybuilder/custom/56f04aeccbbedf0607bbb626 What is normal body temperature? Winning the heptathlon What's Misleading graphs https://www.statisticshowto.com/probability-and-statistics/descriptive-statistics/misleading-graphs/ Longer tasks: Campaigning for change Are males really taller than females? When will women get equal pay? Shopping habits
Specification links	D1.1, D1.2, D1.3 D2.1, D2.2 D3.1, D3.2 D4.1	
Tier 2 Vocab	Analyse, compare, calculate, critical, data, benefit, limitations	
Tier 3 Vocab	Continuous, discrete, box plots, cumulative frequency, stem plots, grouped data, histograms, sampling, random, systematic, mean, median, qualitative, quantative, capture/recapture, cluster, stratified, limitations,	
Homework	Statistical diagrams GCSE recap questions Past exam questions Standard deviation questions	

Career links	Data Analyst https://www.unifrog.org/student/careers/keywords/data-analyst-statistician	
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Cross-curricular links	Geography (population statistics) PE (improving physical performance) Guidance (democracy – campaigning for change) Biology (	
Assessment	Past exam questions Paper 1 mock examination Verbal discussions/questioning	
12 lessons	**NORMAL DISTRIBUTION**	**Contexts/ problems**
Objectives **and** **Common misconceptions**	• Recognise that normal distribution is symmetrical • Understand that the area underneath the normal 'bell' shaped curve represents probability • Use the correct notation relating to standard deviation, population, sample, sum of etc • Understand that approximately 2/3 of observations lie within 1 standard deviation of the mean, and that approximately 95% of observations lie within 2 standard deviations of the mean • Use of the notation N(μ,σ2) to describe a normal distribution in terms of mean and standard deviation • Use a calculator or tables to find probabilities for normally distributed data with known mean and standard deviation	<u>Short tasks:</u> Life of an electrical component <u>Longer tasks:</u> The ℮ mark Over the Hill https://www2.census.gov/programs-surveys/sis/activities/math/hm-2_teacher.pdf
Specification links	S1.1 S2.1 S3.1	
Tier 2 Vocab	Symmetrical, calculate, table, chart, graph, mean, probability	
Tier 3 Vocab	Distribution, normal distribution, standard deviation, notation	
Homework	Use Excel to create a chart to show results from a norm (will create a bell shape) Calculating standard deviation Past Core Maths exam paper questions	
Career links	Food manufacturing inspector https://www.unifrog.org/student/careers/keywords/food-manufacturing-inspector	
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Assessment	Past exam questions Verbal discussions/questioning	
12 lessons	**PROBABILITIES & ESTIMATION**	**Contexts/ problems**
Objectives	• Understand what is meant by the term 'population' • Develop ideas of sampling and know the benefits and potential drawbacks of each method	<u>Short tasks:</u> Which sample?

and **Common misconceptions**	• Know that the mean of a sample is called a 'point estimate' for the mean of the population • Recognise that sample size is likely to affect accuracy • Find confidence intervals within a normal distribution	Population signs https://meiassets.blob.core.windows.net/amsp-uploads/uploads/files/4_Teacher_sheet_-_Population_signs.pdf Longer tasks: Working with large data sets https://mei.org.uk/teachers/a-level-mathematics/resources/working-with-large-data-sets/
Specification links	S4.1, S4.2 S5.1 S6.1	
Tier 2 Vocab	Benefits, drawbacks, develop, understand, recognise, calculate, mean, accuracy	
Tier 3 Vocab	Population, normal distribution, variance, sample, random sample, confidence intervals	
Homework	Use various sampling methods with a data set to explore differences in results Past GCSE questions relating to sampling and population (capture/recapture) Past Core Maths exam questions relating to probability and estimation and population	
Career links	Consumer scientist https://www.unifrog.org/student/careers/keywords/consumer-scientist	
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Assessment	Past exam questions Verbal discussions/questioning	
12 lessons	**CORRELATION & REGRESSION **PRE RELEASE MATERIALS WITHIN MARCH****	**Contexts/ problems**
Objectives **and** **Common misconceptions**	• Recognise whether pairs of data are correlated or not – strong, positive or negative correlation • Understand that correlation does not always imply causation • Identify and understand outliers and make decisions whether or not to include them when drawing a line of best fit • Use product moment correlation coefficient (PMCC) to find the strength of correlation • Know the significance of positive, negative and 0 as PMCC results • Plot lines of best fit on scattergraphs • Plot a regression line from its equation • Understand the potential problems of extrapolation	Short tasks: Reaction times https://meiassets.blob.core.windows.net/amsp-uploads/uploads/files/6_Reaction_time_investigation_-__AQA_version.pdf https://teacher.desmos.com/activitybuilder/custom/5f7dd5fd144f450c73185953 Spurious correlations https://www.tylervigen.com/spurious-correlations Premier League festive fixtures: Which clubs have toughest schedule? http://quibans.blogspot.com/search?q=correlation Names most commonly linked with crime http://quibans.blogspot.com/2021/05/quibans-101-criminals-names.html
Specification links	S7.1, S7.2, S7.3 S8.1, S8.2, S8.3 S9.1, S9.2, S9.3, S9.4, S9.5 S10.1	
Tier 2 Vocab	Positive, negative, recognise, identify, calculate, plot, scattergraph, correlation, accuracy	
Tier 3 Vocab	Causation, outlier, significance, pmcc, regression, regression line, extrapolation	
Homework	GCSE scattergraph and correlation questions Hegarty – scattergraph and correlation Plotting lines of regression Past Core Maths exam questions	

Career links	Data analyst https://www.unifrog.org/student/careers/keywords/data-analyst-statistician	Longer tasks: World data
Employability skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
Cross-curricular links	Geography (world data, correlation) PE (reaction times)	
Assessment	Past exam questions Practice sample material – Paper 2 Verbal discussions/questioning	
21 lessons +	**REVISION AND PRE-RELEASE MATERIAL PRACTICE**	
Objectives and Common misconceptions **Specification links** **Tier 2 Vocab** **Tier 3 Vocab** **Homework** **Career links** **Employability skills**	Using assessment data to target revision for this final 7 weeks until the exam Keep refering to 2023 pre-release material throughout the term Use of past examination papers and pre-release materials to tailor revision of key topics dependent prior misconceptions and assessment data	2019 pre-release materials https://padlet.com/catherine_vansaarloos/hxgpdyemvhit Past papers https://www.aqa.org.uk/subjects/mathematics/aqa-certificate/mathematical-studies-1350/assessment-resources?f.Resource+type%7C6=Question+papers
Assessment	Mini-exam snippets Past exam questions Pre-release sample questions **FINAL EXAMINATION**	