| Stage 8 Mathematics Curriculum Plan | | | | | | | |
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| Unit | Core | | Hinterland | | NC Coverage | Assessment | Whole Education Opportunities |
| | Knowledge | Skills | Knowledge | Skills | | | |
| Ratio and Scale | • Understand the meaning and representation of ratio<br>• Understand and use ratio notation<br>• Understand the link between Ratio and Fractions | • Solve problems involving the ration 1:n or n:1<br>• Solve proportional problems involving the ratio m:n<br>• Divide a value into a given ratio<br>• Express ratio in their simplest form<br>• Express ration in the form 1:n<br>• Compare ratios and their related fractions<br>• Understand pi as a ratio between diameter and circumference<br>• Understand gradient of a line as a ratio | • Links to Architecture and design with using ratio and map scales<br>• Links to recipes and food with proportion<br>• Links to circles- diameter and radius | • Be able to solve problems with ratio using mastery methods such as the bar model | | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links with Art and DT relating to gradient<br>• Links to Catering with ratio and proportion from recipes<br>• Links to Geography with the use of map scales |
| Multiplicative change | • Explore direct proportion in different contexts<br>• Understand scale factors as multiplicative representations | • Solve problems involving direct proportion.<br>• Explore and use conversation graphs<br>• Convert between currencies<br>• Draw and interpret scale diagrams<br>• Interpret maps using scale factors and ratio | • Links to everyday household budgets e.g., as one item doubles, so does the price<br>• Links to currency conversion- a real-life application | • Understand the fundamentals of direct proportion and all the different ways it can be represented such as money, shapes, maps | 3SN3<br>3SN8<br>3SN13<br>4SN5 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links to Geography with the use of map scales<br>• Links to Art and DT with using scales for drawings |
| Working in the Cartesian plane | • Work with the coordinate in all four quadrants.<br>• Explore graphs with a negative gradient<br>• Link graphs to linear sequences<br>• Explore non-linear graphs | • Identify and draw lines that are parallel to the axes<br>• Recognise and use the line y=x and y=kx<br>• Link y=kx to direct proportion problems<br>• Explore the gradient of a line in y=kx<br>• Recognise and use lines y=a+x<br>• Plot graphs in the form y=mx+c<br>• Find the midpoint of a line | • Links to business and economics with financial models and projects<br>• Displays how direct proportion can be shown on a graph e.g. number of pencils in a box<br>• Links to representing real-life data e.g., data shown on the news<br>• Descartes co-ordinate system | • Be able to accurately plot and represent data on a graph.<br>• Be able to interpret and read data from a graph accurately | 3SN4<br>3SN5<br>3WD1<br>4SN4 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links to Geography with map reading skills and direction<br>• Links to Science- representing data on a graph e.g. Speed distance time graphs or plotting data |
| Measures of location | • Understand and use the mean, median and mode | • Find the mean from an ungrouped frequency table | • Links to everyday life situations in which data can be collected and | • Students can collect and analyse their own data e.g., | 3SG9<br>3SR2<br>4SG5 | • Review of prior learning | • Links to Science and the process of data |

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| | • Choose the most appropriate average depending on the context | • Find the mean from a grouped frequency table<br>• Identify an outlier<br>• Compare distributions using averages and the range | analysed e.g. Olympic times or test scores | choose the most appropriate average | 4SG6 | • Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | collection and analysing data.<br>• Links to Geography and analysis of data, working out averages.<br>• Links to Psychology and Sociology for Research Methods and data analysis |
| <mark>Representing Data</mark> | • Understand and describe linear correlation.<br>• Identify non-linear relationships.<br>• Identify different types of data | • Draw and Interpret scatter graphs<br>• Draw and use line of best fit<br>• Read and interpret grouped and ungrouped frequency tables<br>• Represent grouped discrete data<br>• Represent continuous data<br>• Represent data in two-way tables | • Links to everyday situations about variables that are correlated- discussion opportunity e.g. are test scores related to the hours of revision | • Develops data analysis skills that can be used widely across subjects and later in life | 3SP1<br>3SS1<br>3WD5<br>3SA4c | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links to Science with data collection and best way to represent data as well as interpreting data. Line of best fit<br>• Links to Geography for interpreting data sets e.g. correlations<br>• Links to Psychology and Sociology for representing and interpreting data sets e.g. correlations, qualitative vs. quantitative |
| <mark>Multiplying and Dividing Fractions</mark> | • Represent the multiplication of fractions.<br>• Represent the division of fractions | • Multiply a fraction by an integer.<br>• Multiply any pair of fractions.<br>• Divide an integer by a fraction.<br>• Divide a fraction by a unit fraction.<br>• Understand and use the reciprocal.<br>• Divide any pair of fractions.<br>• Multiple and divide improper and mixed fractions.<br>• Multiply and divide algebraic fractions | • Links to money in real-life contexts e.g. sharing out a cost or food | • Use mastery methods to multiply and divide fractions such as bar models and visual representations | 3WD5<br>3SN15<br>3SR4<br>3SR5<br>3SR6<br>3WR6<br>3SR10<br>4SR2<br>4SN7<br><br>3SA1a<br>3SA1b<br>3SA1c<br>3SA1d<br>3SA1e<br>3SA1f<br>3SA4a<br>3SA4b<br>3SA4c<br>3SA4d | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links to Computer programming and science crossover<br>• |
| <mark>Fractions and Percentages</mark> | • Convery fluently between key fractions, decimals and percentages<br>• Understand that fractions and percentages are | • Calculate FDP of an amount with and without a calculator<br>• Convert between FDP greater than 100% | • Links to real-life finances such as finding price increases or decreases.<br>• Links to Mortgage/credit cards etc and interest rates. | • Choose the most appropriate method to solve complex percentage problems | 3WD5<br>3SN15<br>3SN10<br>3SN11<br>3SN15 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks) | • Links with Business and Economics with the financial maths |

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| | equivalent representations of each other | • Work out percentage decrease and increase with a multiplier.<br>• Express one number as a fraction or percentage of another with and without a calculator<br>• Work with percentage change.<br>• Work out reverse percentage to work out the original amount | | | | • Teacher Questioning during lessons<br>• Problems in real world contexts | |
| <mark>Tables and Probability</mark> | • Understand that probability can be represented as a fraction, decimal or a percentage.<br>• Data can be represented in different ways to find probabilities | • Construct a sample space for 1 or more events<br>• Find probabilities from a sample space<br>• Find probabilities from two-way tables<br>• Find probabilities from Venn Diagrams<br>• Use the Product Rule for finding the total number of outcomes | • Links to odds of events happening in everyday context.<br>• Travel – planning a journey or Pilots making decisions.<br>• Links to everyday risk analysis<br>• Research on Pascal who invented one of the first mechanical calculators as well as Pascals Triangle. | • Be able to represent a situation using the most appropriate method e.g. sample space vs two-way table vs Venn diagram | 3SR4<br>3SR5<br>3SR6<br>3WR6<br>3SR10<br>4SR2<br>4SN7 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links with Accounting and Finance e.g. taking risks |
| <mark>Brackets, Equations and Inequalities.</mark> | • Form algebraic expressions.<br>• Use directed number with algebra<br>• Identify and use formulae, expressions, identities and equations | • Multiply out a single bracket.<br>• Factorise a single bracket.<br>• Expand and simplify multiple single brackets<br>• Expand a pair of binomials<br>• Form and Solve equations including brackets<br>• Understand and solve simple inequalities<br>• Form and solve inequalities<br>• Form and solve equations and inequalities with unknowns on both sides | • Explore history and development of algebra and numerical representation in various civilisations | • Use mastery methods so approach and solve a problem e.g. using a bar model vs. algebra tiles vs, function machine<br>• Work with different representations of a question e.g., turning words into algebra and then solving<br>• Apply these algebraic skills to shape problems e.g. area and perimeter | 4SA16<br>4SA17<br>3SA14<br>3SA15<br>3SA16 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links with Science to find unknown variables. |
| <mark>Sequences</mark> | • Understand what a linear/ arithmetic sequence is | • Generate sequences given a simple algebraic rule. | • Explore and research Fibonacci and the Fibonacci Sequence/ Golden Ratio | • Understand the links between sequences and algebra e.g. | SA16<br>4SA17<br>3SA14<br>3SA15 | • Review of prior learning<br>• Formative assessment during lessons | • Explore how the Fibonacci Sequence is found in real life- links to STEAM |

| Topic | | | | | Codes | Assessment | Links |
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| | • Generate sequences given a rule in words | • Generate a sequence given a complex algebraic rule<br>• Find the Nth term of a linear sequence. | | substituting a value in for N | 3SA16<br><br>3SG10<br>3SG11<br>3SG12 | • Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Golden Ratio and how this links to the human body (Science) |
| <mark>Indices</mark> | • Understand the concept of indices/powers | • Adding and subtracting expressions with indices<br>• Simplifying algebraic expressions by multiplying and dividing indices<br>• Using the addition and subtraction laws for indices<br>• Explore powers of powers | • Understand the meaning of equivalence.<br>• Powers and exponents are used in technology and computers | • Linking indices and algebra together to combine the topics | 3SN10<br>3SN11<br>3SN15 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links with Accounting and Finance through financial models<br>• Links to science e.g. exponential decay and growth |
| <mark>Standard Index Form</mark> | • Investigate positive and negative powers of 10<br>• Use a calculator to work with numbers in standard form | • Work with numbers greater than 1 in standard form and between 0 and 1 in standard form<br>• Compare and order numbers in standard form<br>• Calculate with numbers in standard form (add, subtract, multiply and divide)<br>• Understand and use negative and fractional indies | • Links to real-life problems such as distances or masses of planets, comparing populations | • Convert fluently between ordinary numbers and standard form | 3SA7<br>3SA9 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links to Computer programming<br>• Links to science and its use of standard form e.g., microscopes<br>• Links to Geography and population measures or distances |
| <mark>Line Symmetry and Reflection</mark> | • Recognise a line of symmetry | • Reflect a shape in a horizontal or vertical line<br>• Reflect a shape in a diagonal line | • Application to real life designs of buildings, art work | • Links shape with graph axes e.g. reflect in the x-axis | 3SG1<br>3SG2 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks)<br>• Teacher Questioning during lessons<br>• Problems in real world contexts | • Links to Art and DT with geometric designs – possible STEAM link<br>• Links to Science and the human body<br>• |
| <mark>Area of a Trapezia and Circles</mark> | • Understand the concept of perimeters of 2D shapes, including circles<br>• Identify and apply circle definitions and properties, | • Calculate the area of triangles, rectangles and parallelograms<br>• Calculate the area of a trapezium | • Application of rea-life problems with area and perimeter of shapes<br>• Architecture and design of real-world items | • Be able to break down a multi-step problem before attempting the question | 3WD6<br>3SA9<br>4SA8 | • Review of prior learning<br>• Formative assessment during lessons<br>• Low stakes end of unit test (20 marks) | • Links to ART and DT with shapes and measurements |

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| | • Know the formulae: circumference of a circle = 2πr = πd, area of a circle = πr² <br>• Investigate the area of a circle | • Calculate the perimeter and area of compound shapes <br>• Calculate the area of a circle and parts of a circle without a calculator <br>• Calculate the area of a circle with a calculator | | | | • Teacher Questioning during lessons <br>• Problems in real world contexts | |
| <mark>Angles in Parallel Lines and Polygons</mark> | • Understand and use basic angle notation and rules <br>• Investigate angles in parallel lines | • Identify and calculate with alternate, corresponding and co-interior angles <br>• Solve complex problems with parallel line angles <br>• Construct triangles and quadrilaterals <br>• Understand and use the sum of exterior and interior angles in a polygon <br>• Calculate missing angles in a polygon <br>• Construct an angle bisector and perpendicular bisector of a line sengment | • Links to Islamic Art and tessellations <br>• Links to Architecture, Planning and building e.g., The Louvre, The Shard, bridges <br>• Links to Euclid (Father of Geometry) <br>• | • Problem solve with angles in different contexts by combining rules and concepts <br>• Know how to use equipment to measure angles and construct shapes <br>• Understand and use the geometric notation such as Angle ABC in order to solve problems | 3SP1 <br>3SP2 <br>3SS1 | • Review of prior learning <br>• Formative assessment during lessons <br>• Low stakes end of unit test (20 marks) <br>• Teacher Questioning during lessons <br>• Problems in real world contexts | • Links with Sport Science and angles <br>• Links to Art and DT with geometry |
| <mark>Number Sense</mark> | • Understand place value and apply this to rounding. <br>• Understand order of operations | • Round numbers to powers of 10, decimal places and  1 significant figure <br>• Estimate the answer to a calculation <br>• Understand and use error interval notation <br>• Calculate using the order of operations <br>• Calculate with money <br>• Convert metric units of volume <br>• Solve problems involving time and the calendar <br>• Convert metric units of area and volume | • Links to everyday life with calculating with money such as interest, bank balances, credit and debit <br>• Real- life of train and bus timetables to plan a journey. | • Skill of estimating which is used commonly in every-day life | 3SS2 <br>3SS3 <br>3SS4 <br>4SS6 | • Review of prior learning <br>• Formative assessment during lessons <br>• Low stakes end of unit test (20 marks) <br>• Teacher Questioning during lessons <br>• Problems in real world contexts | • Links to Science with rounding and estimating answers <br>• Links to Finances when calculating with money |
| The Data Handling Cycle | • Set up a statistical enquiry. <br>• Identify misleading graphs. <br>• Understand and identify the different types of data | • Design and criticise a questionnaire. <br>• Draw and interpret pictograms, bar charts and line charts <br>• Draw and interpret multiple bar charts, | • Links to everyday life and the data we can collect and represent. <br>• Research and explore graphs that we see in the news and media to analyse them | • Be able to critically analyse data and graphs for a given purpose | 3SS2 <br>4SS5 | • Review of prior learning <br>• Formative assessment during lessons <br>• Low stakes end of unit test (20 marks) | • Links to Geography and collecting data for coursework e.g., conducting a questionnaire. <br>• Links to Sociology and Psychology with |

| | | pie charts and line graphs.<br>• Choose the most appropriate diagram for a given set of data.<br>• Represent and interpret quantitative data.<br>• | | | | • Teacher Questioning during lessons<br>• Problems in real world contexts | research methods and representing data<br>• Links to Science with practical experiments to collect and represent data |

https://nrich.maths.org/famous-mathematicians