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| Subject: Mathematics Year 10H Curriculum Map 2024-2025 |
| Terms | **Topics covered** and **core knowledge and skills** | Links to careers | Links to the Knowledge organiser and other additional resources |
| Half term 1 | **Unit 1: A10 Advanced Linear Graphs and Equations**

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| Find the gradient of a line using change in y/change in x |
| Use the form y=mx+c to draw lines (without plotting points) and factorising to find the root. Sketching linear graphs. |
| Identify equations of parallel and perpendicular lines. |
| Advanced y=mx+c questions - is (x,y) on the given line?, finding equations given two points or a point and gradient. Solve problems related to this. |
| Solve equations in two variables graphically: know that the points on a line represent the solution set to an equation in two variables, and that the intersection of two lines represents the solution to a pair of simultaneous equations in two variables |
| Find the solution to a pair of simultaneous equations by elimination and by substitution, and check the solution |
| Write and solve simultaneous equations from contexts |
| Find regional solutions to linear inequalities in two variables on a Cartesian grid, including regions formed from multiple inequalities and identifying integer solutions in a region. |

**Unit 2: GM4 Congruence and Similarity**

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| Congruence - introduction |
| Tessellating congruent shapes to fill the plane |
| Isometries: translation (as a vector), reflection and rotation, including rotational and reflective symmetry, combinations of transformations, including successive translations. Knowing that reflection, rotation and translation produce congruent shapes |
| Similarity of length, proving shapes are similar, finding scale factors and writing equivalent sides as equivalent ratios |
| Enlargement (including negative and fractional enlargements). Knowing that enlargements produce similar shapes |
| Conditions for congruent triangles - simple examples, getting familiar with terms |

 | Algebra:<https://www.youtube.com/watch?v=c4xwvFtsrMU>Graphs<https://www.youtube.com/watch?v=JcEHR6O5E6Q>Inequalities:<https://www.youtube.com/watch?v=5sOw5og5sgc>Simultaneous Equations:<https://www.youtube.com/watch?v=z5p8MQSGh0w>2D Shapes:<https://www.youtube.com/watch?v=Ybe3gKeT7Jo>Geometry:<https://www.youtube.com/watch?v=b4Shg4r8gng>Ratio:<https://www.youtube.com/watch?v=BU9mKIvfxYU>Transformations:<https://www.youtube.com/watch?v=ejuJ20JroTo> | This link would take you to the KO on our website<https://teachers.thenational.academy/subjects/maths/key-stages/key-stage-4><https://www.bbc.co.uk/bitesize/subjects/z38pycw><https://vle.mathswatch.co.uk/vle/><https://corbettmaths.com/contents/> |
| Half term 2 | **Unit 3: GM5 Right-Angled Triangles**

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| Pythagoras' Theorem in 2D to find missing sides |
| Proving a triangle is right-angled with Pythagoras |
| Identifying Pythagorean triples |
| Pythagoras to find the distance between two points |
| Trigonometric ratios for finding missing sides in right-angled triangles |
| Trigonometric ratios for finding missing angles in right-angled triangles |
| Exact values of sinq, cosq and tanq for q = 0, 30, 45, 60, 90 by heart |
| Problems involving Pythagoras and trigonometry (including bearings), method selection practice |

**Unit 4: NP13 Advanced Proportion and Rates of Change**

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| Reverse percentages (original value problems) and finding the original value given a percentage of it |
| Simple interest |
| Direct (linear) proportion - first numerically, then graphically, then algebraically |
| Inverse proportion (excluding squares, cubes, roots) - first numerically, then graphically, then algebraically |
| Compound units - density, pressure, speed, value for money (what unit have I found?), including conversions between compound units |
| Ratio problems - combining ratios, finding parts, differences and wholes; mixing ratios with fractions (part/part and part/whole) |

 | Angles:<https://www.youtube.com/watch?v=S-Xx22DaOvE>Problem Solving:<https://www.youtube.com/watch?v=430Cs09V2n4>Pythagoras:<https://www.youtube.com/watch?v=KY8rRWvmt5c>Trigonometry:<https://www.youtube.com/watch?v=v62GGaDpk9Q>Finance<https://www.youtube.com/watch?v=Yjc_VxMMCy8>Measurement<https://www.youtube.com/watch?v=8uSmX2zNul0>Percentages<https://www.youtube.com/watch?v=7EB0H1bhGTo>Proportion<https://www.youtube.com/watch?v=Mz4nMRtTDCw>Ratio<https://www.youtube.com/watch?v=BU9mKIvfxYU> |  |
| Half term 3 | **Unit 5: GM6 Circles**

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| Circle parts and properties |
| Circumference of a circle (and semi/quarter circles), in terms of pi and rounded |
| Area of a circle (recap) and semi/quarter circles, in terms of pi and rounded |
| Problems with circumference and area of a circle |
| Length of an arc and area of a sector |
| Identifying and using the circle theorems |

**Unit 6: GM7 Advanced Drawing, Measuring and Constructing**

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| Interior and exterior angles in polygons |
| Problems with angles, including in parallel lines, bearings and polygons, and explaining reasoning |
| Converting between 2D and 3D units of measurement |
| Naming and recognising polyhedra. Labelling conventions (for faces esp). Euler's Formula (F + V - 2 = E) |
| Drawing 3D shapes: normal and isometric. |
| 2D representations of 3D shapes: constructing and interpreting nets, plans and elevations |
| Planes of symmetry |
| Loci - fixed distance from a point, fixed distance from a line, equidistant from a two points, equidistant from two lines |

**Unit 7: SP4 Continuous Data**

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| Measures of central tendency of grouped data - mean, mode and median |
| Graphical representations of continuous and grouped data - cumulative frequency and boxplots (unequal and equal class widths) |
| Measures of spread - interquartile range, including why it is better than the range |
| Compare data sets through graphs, central tendency and spread |

 | Circles: <https://www.youtube.com/watch?v=-PGrkZkYSF0>Area:<https://www.youtube.com/watch?v=D8RJUooe9CI>Angles:<https://www.youtube.com/watch?v=S-Xx22DaOvE>Measurement:<https://www.youtube.com/watch?v=8uSmX2zNul0>2D Shapes:<https://www.youtube.com/watch?v=Ybe3gKeT7Jo>3D Shapes:<https://www.youtube.com/watch?v=0sOpcrywXz0>Symmetry:<https://www.youtube.com/watch?v=WMV_bw17JzI>Averages:<https://www.youtube.com/watch?v=SALCargi1_0>Data:<https://www.youtube.com/watch?v=SBPtIAv5CRM>Graphs:<https://www.youtube.com/watch?v=JcEHR6O5E6Q> |  |
| Half term 4 | **Unit 8: SP5 Set Theory and Logic**

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| Thinking logically |
| Representing sets with set notation |
| Representing sets with Venn diagrams |
| Intersections and unions of sets (in notation and on Venns), subsets |
| Solving probability problems using sets |
| Applying the 'AND' and 'OR' rules for independent and mutually exclusive events. Linking to intersections and unions |
| Represent the solutions to linear inequalities using set notation |

**Unit 9: NP14 Number Theory**

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| the Fundamental Theorem of Arithmetic |
| finding HCF/LCM using prime factors |
| HCF/LCM problems |
| advanced prime factors - square/cube numbers, using numbers given in factorised form |
| recurring and terminating decimals - prime factor rule for identifying terminating decimals, converting a recurring decimal to a fraction |
| writing error intervals (recap rounding and truncation); calculations with upper and lower bounds, combining upper and lower bounds, percentage error of these calculations |

 | Probability:<https://www.youtube.com/watch?v=cJ1QPiGnGEM>Inequalities:<https://www.youtube.com/watch?v=5sOw5og5sgc>Multiples:<https://www.youtube.com/watch?v=xyOCgnixiaE>Decimals:<https://www.youtube.com/watch?v=X0Gl72XKiyI>Estimation:<https://www.youtube.com/watch?v=meOjLJF9F7U> |  |
| Half term 5 | **Unit 10: A11 – Advanced Manipulating and Simplifying Expressions**

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| Addition and subtraction of indices, power of a power, power of 0 |
| expand two and three binomials, including adding expressions which need first expanding |
| factorising a quadratic where a = 1 |
| factorising the difference of two squares |
| **factorising a quadratic where a > 1** |
| **simplifying algebraic fractions, including numerical factors, single letter factors and bracket factors** |
| rearranging more complex formulae (including non-linear, subject in denominator, **and subject appearing twice**) |
| **simplifying an expression by factorising out a bracket** |

**Unit 11: A12 – Quadratic Graphs and Equations**

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| Plotting a quadratic and reading values from a graph; solving quadratics graphically and simple ax^2=b by rearrangement |
| Solving quadratic equations = 0 by factorising, identifying the solutions on a graph |
| **Solving quadratic equations = 0 using the quadratic formula, identifying the solutions on a graph** |
| **Completing the square to find roots. Simple examples where b is even and a = 1.** |
| Producing a sketch graph of a quadratic by finding roots, y-intercept and turning points (by symmetry only) |
| **Solving quadratics presented not equal to 0, selecting the best method for solving** |

 | Algebra:<https://www.youtube.com/watch?v=c4xwvFtsrMU>Powers and Roots:<https://www.youtube.com/watch?v=I95Nw1Pwl7c>Quadratic Equations:<https://www.youtube.com/watch?v=QAmbU12zs8c>Quadratic Equations:<https://www.youtube.com/watch?v=QAmbU12zs8c>Graphs:<https://www.youtube.com/watch?v=JcEHR6O5E6Q> |  |
| Half term 6 | **Unit 12: GM8 – Surface Area and Volume**

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| Surface area of prisms and cylinders |
| Surface area of spheres, pyramids, cones, composite solids, frustums and other polyhedra |
| Volume of prisms and cylinders |
| Volume of spheres, pyramids, cones, composite solids, frustums and other polyhedra |
| **Similarity of volume and area - generalising LAV similarity with scale factors and ratios** |

**Unit 13: A13 – Advanced Sequences**

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| working with visual representations of arithmetic, **quadratic and geometric** sequences |
| Fibonacci sequences - numerical and algebraic |
| **Quadratic sequences, including finding the nth term** |
| **Recurrence relations** |

 | 2D Shapes:<https://www.youtube.com/watch?v=Ybe3gKeT7Jo>3D Shapes:<https://www.youtube.com/watch?v=0sOpcrywXz0>Area:<https://www.youtube.com/watch?v=D8RJUooe9CI>Patterns:<https://www.youtube.com/watch?v=GIspObxnA7w>Sequences:<https://www.youtube.com/watch?v=7Vf6BJwdy_0> |  |