Subject	Y11 Core Knowledge – Autumn/Spring/Summer term	How to support students' learning
Maths	**Probability -** 1. Find probabilities from a sample space diagram (M718). 2. Use product rule for finding total number of possible outcomes (U369). 3. Calculate probability of independent events 4. Expected outcomes (M206) (U166). 5. Using experimental data to estimate probabilities (M322) (U580). 6. Understand that increasing the number of trials leads to a more accurate estimate of the theoretical probability. 7. Use the conditional probability formula (U821). 8. Finding conditional probabilities from two-way tables (U246). 9. Construct frequency trees (U280). 10. Find probabilities from frequency trees (U280). 11. Solve problems with frequency trees (U280). 12. Use tree diagrams for independent events (M299) (U558). 13. Use tree diagrams for dependent events (M572) (U729). 14. Construct and interpret conditional probabilities (tree diagrams) (U806). 15. Understand and use the union of sets (M834). 16. Understand and use the intersection of sets (M834). 17. Understand and use the complement of a set (M834). 18. Using set notation (M834) (U296). 19. Finding conditional probabilities from Venn diagrams(U699). **Sampling & Graphical Representation of Data -** 20. Capture-recapture (U328). 21. Construct a stratified sample. 22. Construct box plots (U879). 23. Interpret box plots (U837). 24. Construct cumulative frequency diagrams (U182). 25. Use cumulative frequency diagrams to find measures. 26. Interpret cumulative frequency diagrams (U642). 27. Construct histograms (U814). 28. Interpret histograms (U983). 29. Calculating averages from histograms (U267). 30. Criticise charts and graphs.	• Student can complete independent practice on Dr Frost Maths https://www.drfrost.org/index.php • Dr Frost Maths has topic-based learning with videos to support students and questions available that give automatic feedback to students. • Otherwise, students can also access past papers that can be completed online. • All homework and revision for students will be set on Dr Frost by their class teacher. **Other useful websites:** • Maths Genie (topic based and past papers) https://www.mathsgenie.co.uk/gcse.php • On Maths (online papers) https://www.onmaths.com/

	31. Compare distributions using charts and measures (U520). 32. Compare distributions using cumulative frequency graphs and box plots (U507). **Congruency and Similarity -** 33. Locus of distance from a point (M253) (U820). 34. Locus equidistant from two points (M253) (U820). 35. Locus of distance from a straight line/shape (M253) (U820). 36. Locus of distance from two lines (M253) (U820). 37. Construct triangles when given SSS (M565) (U187). 38. Construct triangles when given SAS and ASA (M565) (U187). 39. Construct a perpendicular bisector (M239) (U245). 40. Construct a perpendicular from a point (M239) (U245). 41. Construct a perpendicular to a point (M239) (U245). 42. Construct an angle bisector (M232) (U787). 43. Prove a pair of triangles are congruent (U471). 44. Understand and represent vectors (U632). 45. Draw and understand addition and subtraction of vectors (U903). 46. Describe translations of shapes (M139) (U196). 47. Translate shapes by a given vector (M139) (U196). 48. Describe rotation (M910) (U696). 49. Rotate a shape (M910) (U696). 50. Rotate a shape about a point (M910) (U696). 51. Describe reflection (M290) (U799). 52. Reflect shapes in given lines (M290) (U799). 53. Identify invariant points and lines. 54. Work out missing sides and angles in a pair of given similar shapes (M324) (U578). 55. Explore areas of similar shapes (U630). 56. Explore volumes of similar shapes (U110). 57. Solve mixed problems involving similar shapes (U112). 58. Draw and understand vectors multiplied by a scalar (U564). 59. Describe enlargements (M178) (U519). 60. Enlarge a shape by a positive integer scale factor (U519). 61. Enlarge a shape by a positive integer scale factor from a point (U519).	

	62. Enlarge a shape by a positive fractional scale factor (U134). 63. Enlarge a shape by a negative scale factor (M178) (U134). 64. Combining transformations (M881, U766). **Algebra recap, algebraic fractions and proof -** 65. Simplify algebraic fractions by cancelling common factors (M568) (U103). 66. Simplify algebraic fractions by factorising into one bracket (M754) (U437). 67. Simplify algebraic fractions by factorising into two brackets (M754) (U294). 68. Add and subtract algebraic fractions (M336) (U685). 69. Multiply algebraic fractions (U457). 70. Divide algebraic fractions (U824). 71. Solve equations with algebraic fractions (M387) (U505). 72. Represent numbers algebraically. 73. Form algebraic proof (U582). **Indices and surds -** 74. Estimating roots and powers (U299). 75. Understand and use negative indices (M150) (U694). 76. Understand and use fractional indices (U985, U772). 77. Manipulate indices. 78. Simplifying surds (U338). 79. Adding and subtracting surds (U872). 80. Multiplying and dividing surds (U633). 81. Expanding brackets with surds (U499). 82. Rationalising denominators containing a single term (U707). 83. Rationalising denominators containing two terms (U281). **Change the subject and iteration -** 84. Change the subject where the subject appears more than once (M184) (U556). 85. Using recurrence relations (U171). 86. Sign change method for iteration. 87. Substituting into iterative formulae (U434). 88. Finding approximate solutions to equations using iteration (U168). **3D shapes and trigonometry -** 89. Construct and interpret plans and elevations (M229) (U743). 90. Explore volumes of pyramids (U484).	

	91. Finding the surface area of pyramids (U871). 92. Find the volume of composite shapes (U543). 93. Finding the surface area of composite shapes (U561). 94. Find the volume of a frustum (U350). 95. Finding the surface area of frustums (U334). 96. Calculations with upper and lower bounds (M730) (U587). 97. Solve bearings problems using Pythagoras and trigonometry (U164). 98. Use the sine rule to find missing angles (U952). 99. Use the sine rule to find missing lengths (U952). 100. Use the cosine rule to find missing angles (U591). 101. Use the cosine rule to find missing lengths (U591). 102. Find the area of a non right-angled triangle (U592). 103. Problem solving involving advanced trigonometry. 104. Angles of elevation and depression (U967). 105. Solve bearings problems using sine and cosine rules. **Circle theorems and vectors -** 106. Understand and use alternate segment theorem (U130). 107. Understand and use angle between a radius and a chord (U489). 108. Understand and use angle between a radius and a tangent (U489). 109. Understand and use angles at the centre and circumference (U459). 110. Understand and use angles in a cyclic quadrilateral (U251). 111. Understand and use angles in a semicircle (U459). 112. Understand and use angles in the same segment (U251). 113. Understand and use two tangents from a point (U489). 114. Mixed problems: Circle Theorems (U808). 115. Proving the circle theorems (U807). 116. Explore vector journeys in shapes (U781). 117. Understand parallel vectors (U660). 118. Explore collinear points using vectors (U560). 119. Solve problems involving vectors (U781). 120. Use vectors to construct geometric arguments and proofs (U560).	

	Non-linear graphs - 121. Solve quadratics by factorising (U228). 122. Solve harder quadratics by factorising (U960). 123. Understand and identify turning points of a quadratic graph. 124. Identify and interpret roots and intercepts of quadratics (U667). 125. Complete the square (U397). 126. Finding the turning point of a quadratic by completing the square (U769). 127. Solve quadratic equations by completing the square (U589). 128. Solve quadratic equations using the quadratic formula (U665). 129. Represent solutions to single inequalities on a graph using lines parallel to the axes (U747). 130. Represent solutions to single inequalities on a graph using straight lines (U747). 131. Represent solutions to multiple inequalities on a graph (U747). 132. Solve quadratic inequalities in one variable (U133). 133. Graphs of cubic functions (U980). 134. Graphs of exponential functions (U229). 135. Graphs of reciprocal functions (U593). 136. Know graphs of trigonometrical functions (U450). 137. Recognise graph shapes. 138. Find and use the equation of a circle centre (0,0) (U567). 139. Find the equation of the tangent to any curve (U567). **Graphs and proportion -** 140. Calculating speed from distance-time graphs (M247) (U462). 141. Calculating distances from velocity-time graphs (U611). 142. Estimate the area under a curve (U882). 143. Calculating acceleration from velocity-time graphs (U562). 144. Estimate the gradient of a non-linear graph using a tangent (U800). 145. Construct real-life straight line graphs (M843) (U652). 146. Understand and interpret linear real-life graphs (M771) (U638). 147. Interpret gradient and intercepts of real-life graphs (M205) (U862). 148. Finding the equations of real-life straight line graphs (M205).	

	149. Link Y=KX to direct proportion problems (M448). 150. Explore direct proportion graphs (M771) (U638). 151. Explore inverse proportion graphs (M448) (U238). 152. Solve problems with inverse proportion (M478) (U357). 153. Construct direct proportion equations (M472) (U640). 154. Substitute into direct proportion equations (M472) (U407). 155. Construct inverse proportion equations (M665) (U364). 156. Substitute into inverse proportion equations (M665) (U138). 157. Direct and inverse proportion mixed problems. **Functions and graph transformations -** 158. Substituting into functions (U637). 159. Find composite functions (U448). 160. Substituting into composite functions (U895). 161. Find inverse functions (U996). 162. Know graphs of trigonometrical functions (U450). 163. Sketch and identify translations of the graph of a given function (U598). 164. Sketch and identify reflections of the graph of a given function (U487). 165. Identify and complete graph transformations (U455). 166. Complete the square (U397). 167. Finding the turning point of a quadratic by completing the square (U769). **Simultaneous equations -** 168. Solving simultaneous equation graphically (M658) (U836). 169. Find approximate solutions to equations using graphs. 170. Solve a pair of linear simultaneous equations by adjusting one equation (M852) (U760). 171. Solve a pair of linear simultaneous equations by adjusting both equations (M852) (U760). 172. Determine whether a given (x,y) is a solution to a pair of linear simultaneous equations. 173. Constructing and solving simultaneous equations (U137). 174. Solve linear simultaneous equations using substitution (U757). 175. Solve a pair of linear simultaneous equations (one linear, one quadratic) algebraically (U547).	

	176. Determine whether a given (x,y) is a solution to both a linear and quadratic equation (U547).	