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| **Subject**  | **Year 10 Higher Threshold Concepts – Autumn Term**  | **How to support students’ learning**  |
| Mathematics  | **Data Collection and Sampling*** Understand terms sampling and bias
* Calculate averages and range for ungrouped data in lists, frequency tables and grouped data
* Understand the properties of populations or distributions from a sample or summary statistics.

**Organising, Presenting and Analysing Data*** Draw histograms with equal class widths
* Draw histograms with unequal class widths
* Interpret data from histograms
* Calculate averages from histograms
* Draw cumulative frequency graphs
* Interpret data from cumulative frequency graphs
* Draw box plots
* Interpret data from box plots
* Compare populations using box plots and cumulative frequency graphs

**Integers and Indices*** Use standard form with positive and negative indices
* Multiply and divide numbers in standard form
* Add and subtract numbers in standard form
* Use standard form with a calculator

**Algebraic Manipulation** * Recognise the difference between an equation and an identity, and show algebraic expressions are equivalent.
* Create and use formulae and expressions from real-world contexts
* Understand the completing the square process
* Factorise quadratic expressions
* Rearrange formulae to change the subject where the subject appears twice or where a power or reciprocal of the subject appears
* Simplify algebraic fractions by factorising into one bracket
* Simplify algebraic fractions by factorising into two brackets
* Add and subtract algebraic fractions

**Pythagoras and Trigonometry*** Use Pythagoras' theorem in 3D
* Use the exact values of trigonometric ratios
* Learn and use trigonometric graphs
* Use trigonometry in 3D shapes

**Algebraic Solutions of Equations*** Factorise to solve quadratic equations
* Rearrange and solve quadratic equations by using the completing the square process
* Rearrange and solve quadratic equations by using the quadratic formula
* Construct and solve quadratic equations
* Solving simultaneous equations involving quadratics
 |  * Encourage your child to look at real-life graphs and tables of data
* Discuss applications of questionnaires
* Encourage your child to have the correct equipment for lessons, e.g. a pencil, ruler, protractor, calculator
* Use [www.sparx.com](https://sparxmaths.com/)for support if needed. Teachers will have provided your child with a login and password
* Encourage your child to show all their working out. If they have homework online, then encourage them to write down all their working out in their exercise books
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* Encourage your child to look at real-life examples of standard form numbers, e.g. very small (biological cells) and very large scientific numbers (astronomical weights and distances)
* Encourage your child to have the correct equipment for lessons, e.g. a calculator
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* Encourage your child to practise their algebra skills and factors of numbers
* Discuss how to substitute and use real-life formulas, e.g. cooking instructions based on weight
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* Encourage your child to look back at their notes and to review Pythagoras’ Theorem
* Encourage your child to look back at their notes and to review trigonometric ratios SOHCAHTOA and the special angles
* Encourage your child to use the website www.GeoGebra.org to plot functions to see what their graphs look like
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