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| Name: |  |

**YORK ST. JOHN UNIVERSITY**

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| **SECONDARY PGCE MATHEMATICS****SUBJECT KNOWLEDGE AUDIT** |

**Purpose of the Audit**

Your subject knowledge strengths and weaknesses are used as a basis for discussion during the PGCE course. At the beginning of the course, the audit is used to inform planning for the development of key ‘gap’ areas of subject knowledge. In school placements, you will identify curriculum areas that you feel less secure about and need revision, through discussion with your Mentor. Complete the enclosed audit as **accurately** and **completely** as possible using the Red, Amber and Green where applicable. **This audit will be used on subject knowledge days. Use this as an ongoing document to enhance your knowledge. Store worked examples on these mathematics topics on file (online / electronic or hard copies) to support your lesson planning.**

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| **Choose a colour and fill in the boxes below by date** | **Pre-course** | **End-SE1** | **End-SE2** | **End-SE3** |
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for example, by the end of SE2, it might look like this:

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| **Pre-course** | **End-SE1** | **End-SE2** | **End-SE3** |

| **Mathematics Topics****Key Stage 3-5** | **I don’t know this** | **SK insecure** | **SK secure** | **I can teach this** | **I know several ways to teach this** |
| --- | --- | --- | --- | --- | --- |
| **Number** | **Integers, powers and square/cube roots** |  |  |  |  |  |
| **Fractions, Decimals, Percentages** |  |  |  |  |  |
| **Ratio and Proportion** |  |  |  |  |  |
| **Estimation, Approximation and Bounds of Error** |  |  |  |  |  |
| **Fractional and Negative Indices, Index Laws, Reciprocals** |  |  |  |  |  |
| **Standard Form, Scientific Notation** |  |  |  |  |  |
| **A LEVEL:** |  |  |  |  |  |
| Use of Significant Figures and Decimal Places |  |  |  |  |  |
| Numerical Surds |  |  |  |  |  |
| Complex Numbers |  |  |  |  |  |
| Rational and irrational numbers |  |  |  |  |  |
| Logical Proof |  |  |  |  |  |
| Number theory |  |  |  |  |  |
| Set Theory |  |  |  |  |  |
| Computability |  |  |  |  |  |

| **Mathematics Topics** **Key Stages 3 - 5** | **I don’t know this** | **SK insecure** | **SK secure** | **I can teach this**  | **I know several ways to teach this** |
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| **Algebra** | **Algebraic Manipulation, Functions, Equations** |  |  |  |  |  |
| **Linear Equations, Simultaneous Linear Equations** |  |  |  |  |  |
| **Inequalities** |  |  |  |  |  |
| **Numerical Methods** |  |  |  |  |  |
| **Arithmetic Sequences** |  |  |  |  |  |
| **Graphs, Domains and Ranges** |  |  |  |  |  |
| **Quadratics, Simultaneous quadratics** |  |  |  |  |  |
| **Transformation of functions and their graphs** |  |  |  |  |  |
| **A LEVEL:** |  |  |  |  |  |
| Higher polynomials |  |  |  |  |  |
| Indices and Logarithms |  |  |  |  |  |
| Curve Sketching |  |  |  |  |  |
| Arithmetic and Geometric Sequences and Series, Binomial Theorem |  |  |  |  |  |
| Chaotic Functions, Fractals, Mandelbrot Sets etc. |  |  |  |  |  |
| Hyperbolic Functions |  |  |  |  |  |
| Rational Functions |  |  |  |  |  |
| Power, binomial, exponential and logarithmic series |  |  |  |  |  |
| Matrix algebra |  |  |  |  |  |
| Topology |  |  |  |  |  |
| **Calculus** | Principles and History of The Calculus, continuity, limits |  |  |  |  |  |
| Differentiation (algebraic and transcendent functions) |  |  |  |  |  |
| Integration (definite and indefinite) |  |  |  |  |  |
| Numerical Integration (Simpson’s rule etc.) |  |  |  |  |  |
| Differential Equations |  |  |  |  |  |
| Functions of Several Variables |  |  |  |  |  |
| Real and Complex Analysis |  |  |  |  |  |
| **Geometry** | **Angles, Parallel Lines, Triangles, Quadrilaterals** |  |  |  |  |  |
| **Pythagoras’ Theorem** |  |  |  |  |  |
| **Circle Theorems** |  |  |  |  |  |
| **Transformations** |  |  |  |  |  |
| **Measurement** |  |  |  |  |  |
| **Constructions** |  |  |  |  |  |
| **Areas, volumes, perimeters and surface area** |  |  |  |  |  |
| **Loci** |  |  |  |  |  |
| **Congruence and Similarity** |  |  |  |  |  |
| **Trigonometry, Graphs of Trigonometric Functions** |  |  |  |  |  |
| **Vectors** |  |  |  |  |  |
| **A LEVEL:** |  |  |  |  |  |
| Matrices |  |  |  |  |  |
| Trigonometric Functions and Identities |  |  |  |  |  |
| Parametric and Polar Functions |  |  |  |  |  |
| Equations of circles, ellipses etc. |  |  |  |  |  |
| Radian measure |  |  |  |  |  |
| **Statistics** | **The statistical process – planning, collecting, processing, interpreting** |  |  |  |  |  |
| **Data-collection methods** |  |  |  |  |  |
| **Statistical tables and charts** |  |  |  |  |  |
| **Averages (mean, median, mode)** |  |  |  |  |  |
| **Scatter graphs and correlation** |  |  |  |  |  |
| **Sampling** |  |  |  |  |  |
| **Interquartile range** |  |  |  |  |  |
| A LEVEL: |  |  |  |  |  |
| Moving averages, Standard Deviation |  |  |  |  |  |
| Hypothesis Testing |  |  |  |  |  |
| Regression Analysis |  |  |  |  |  |

| **Mathematics Topics****Key Stages 3 - 5** | **I don’t know this** | **SK insecure** | **SK secure** | **I can teach this** | **I know several ways to teach this** |
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| **Probability** | **Practical probability, estimates of probability, probability scale, effects of sample size** |  |  |  |  |  |
| **Theoretical probabilities for one and two events, sample space diagrams** |  |  |  |  |  |
| **Independent and mutually exclusive events** |  |  |  |  |  |
| **Tree diagrams** |  |  |  |  |  |
| **A LEVEL:** |  |  |  |  |  |
| Combinations and Permutations |  |  |  |  |  |
| Conditional probability, Bayesian statistics |  |  |  |  |  |
| Probability distributions, variance, expectation, the “normal” curve etc. |  |  |  |  |  |
| Multivariate Analysis |  |  |  |  |  |
| **Mechanics** | Kinematics and Dynamics |  |  |  |  |  |
| Work, Energy and Power |  |  |  |  |  |
| Impulse and Momentum |  |  |  |  |  |
| Circular Motion, Projectiles |  |  |  |  |  |
| Variable Forces, SHM |  |  |  |  |  |
| Statics, Moments, Couples, Centres of Mass, Friction |  |  |  |  |  |
| Bending Moments, Shearing Force |  |  |  |  |  |
| **Discrete** | Algorithms |  |  |  |  |  |
| Network Diagrams, Shortest Path Problems |  |  |  |  |  |
| Linear Programming |  |  |  |  |  |
| Critical Path Analysis |  |  |  |  |  |
| Game Theory |  |  |  |  |  |

**SUBJECT CURRICULUM KNOWLEDGE AUDIT 2022/23**

**MATHEMATICS**

Knowledge Red None or recalled from own experience as pupil/student

 Amber Outline knowledge based on general reading or hearsay

 Green Detailed knowledge based on specialist reading or recent

experience of schools

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| **Mathematics Education** | **Knowledge** **(R or A or G)** |
| **Curriculum** | The National Curriculum for Secondary Education |  |
| GCSE subject content and assessment objectives |  |
| Guidelines and Code of Practice for supporting students with Special Education Needs |  |
| Guidelines for including pupils for whom English is an additional language (EAL) |  |
| **Resources** | The use of ICT for teaching and learning mathematics |  |
| Published schemes and resources (e.g. DfE Standards Unit)  |  |
| Research into problem solving within mathematics (Investigations, practical work etc.) |  |
| **Qualifications** | Knowledge of entry level mathematics |  |
| Specifications for the new GCSE Mathematics |  |
| Core Maths (for post 16 who already possess a GCSE Maths) |  |
| New Specifications for AS/A Level Mathematics |  |
| New Specifications for Further Mathematics |  |

**Manjinder K. Jagdev, Alice Ward-Gow**