Mathematics Subject Audit 2022-23  
Secondary Subject-Knowledge Development

 **Self-Audit** **page 2**Complete the following audit of your skills and understanding in this  
subject area. Rate yourself against each criterion by colour-coding the  
relevant box (None, Expected, Expected +, Good or Excellent):

**g 4 None** No knowledge /confidence in this area and/or no experience.   
**(only grade yourself grey if you have no experience  
whatsoever of a particular aspect)**

**g 3 Expected** Some knowledge in this area and/or limited experience and  
in need of further development

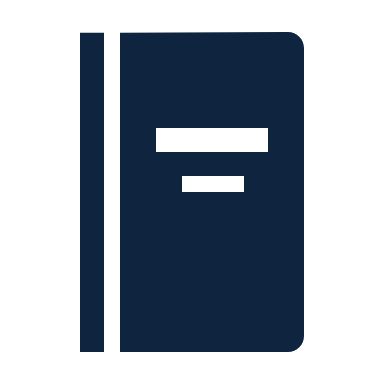
**g 2.5 Expected+** Developing knowledge / growing experience in this area

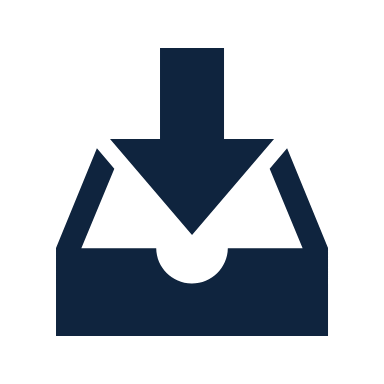
**g 2 Good** Good knowledge in this area and /or some experience

**g 1 Excellent** Totally confident in my knowledge of this area and/or lots  
of experience

The completed audits will be reviewed with your Mentor and used to create your Individual Training Plan  
**NB:** In addition to the content of this audit there will be specific content that will need to be known prior to the teaching of specific qualifications. This audit is **not** exhaustive and there will be specific skills and capabilities that will need to be addressed in addition to this.

**Subject Knowledge Development**

 **SK Days Compulsory Reading**  **page 12**This is the list of reading to complete before and after each Subject Knowledge Day. Reflect on  
the reading as part of the weekly Academic Reading Reflection in your Reflective Journal.

 **SK Development Task Bank** **page 13**Once you have completed the Baseline self-assessment, please select and complete one of the tasks from the Subject Knowledge Development Task Bank.As you review your knowledge each term, continue identifying and completing relevant tasks from the Task Bank.

 **Evidence of SK Development** **page 22**Keep a record of your Subject-Knowledge Development in the evidence summary. This will be signed off by your mentor and SK tutor.

**Appendix**

**Appendix A: SK in the Carter Review and the ITT CCF page 23**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subject Area:** | | **Mathematics** | **Baseline** | **Autumn** | **Spring** | **Summer** |
| **Subject Knowledge & Understanding** | | | | | | |
| **Subject Knowledge *(Based on DfE Mathematics Programme of Study KS4 2014)*** | | | | | | |
| Number | | | | | | |
| SK.1 | Apply systematic listing strategies, including use of the product rule for counting | |  |  |  |  |
| SK.2 | Estimate powers and roots of any given positive number | |  |  |  |  |
| SK.3 | Calculate with roots, and with integer and fractional indices | |  |  |  |  |
| SK.4 | Calculate exactly with fractions, surds and multiples of π; simplify surd expressions involving squares [for example = = and rationalise denominators | |  |  |  |  |
| SK.5 | Calculate with numbers in standard form A x 10n, where 1 ≤ A < 10 and n is an integer | |  |  |  |  |
| SK.6 | Change recurring decimals into their corresponding fractions and vice versa | |  |  |  |  |
| SK.7 | Identify and work with fractions in ratio problems | |  |  |  |  |
| SK.8 | Apply and interpret limits of accuracy when rounding or truncating, including upper and lower bounds | |  |  |  |  |
| Algebra | | | | | | |
| SK.9 | Simplify and manipulate algebraic expressions (including those involving surds and algebraic fractions) | |  |  |  |  |
| SK.10 | Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs | |  |  |  |  |
| SK.11 | Interpret simple expressions as functions with inputs and outputs; interpret the reverse process as the ‘inverse function’; interpret the succession of two functions as a ‘composite function’ | |  |  |  |  |
| SK.12 | Use the form y = mx + c to identify parallel and perpendicular lines; find the equation of the line through two given points, or through one point with a given gradient | |  |  |  |  |
| SK.13 | Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square | |  |  |  |  |
| SK.14 | Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function y = with x ≠ 0, the exponential function y = kx for positive values of k, and the trigonometric functions (with arguments in degrees) y = sin x, y = cos x, and y = tan x for angles of any size | |  |  |  |  |
| SK.15 | Sketch translations and reflections of the graph of a given function | |  |  |  |  |
| SK.16 | Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration | |  |  |  |  |
| SK.17 | Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts | |  |  |  |  |
| SK.18 | Recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point | |  |  |  |  |
| SK.19 | Solve quadratic equations including those that require rearrangement algebraically by factorising, by completing the square and by using the quadratic formula; find approximate solutions using a graph | |  |  |  |  |
| SK.20 | Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph | |  |  |  |  |
| SK.21 | Find approximate solutions to equations numerically using iteration | |  |  |  |  |
| SK.22 | Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution | |  |  |  |  |
| SK.23 | Solve linear inequalities in one or two variables, and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph | |  |  |  |  |
| SK.24 | Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (r n where n is an integer, and r is a positive rational number or a surd) and other sequences | |  |  |  |  |
| SK.25 | Deduce expressions to calculate the nth term of linear and quadratic sequences | |  |  |  |  |
| Ratio, proportion and rates of change | | | | | | |
| SK.26 | Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios) | |  |  |  |  |
| SK.27 | Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts | |  |  |  |  |
| SK.28 | Understand that X is inversely proportional to Y is equivalent to X is proportional to ; construct and interpret equations that describe direct and inverse proportion | |  |  |  |  |
| SK.29 | Interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion | |  |  |  |  |
| SK.30 | Interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts | |  |  |  |  |
| SK.31 | Set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes | |  |  |  |  |
| Geometry and measures | | | | | | |
| SK.32 | Interpret and use fractional and negative scale factors for enlargements | |  |  |  |  |
| SK.33 | Describe the changes and invariance achieved by combinations of rotations, reflections and translations | |  |  |  |  |
| SK.34 | Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment | |  |  |  |  |
| SK.35 | Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results | |  |  |  |  |
| SK.36 | Construct and interpret plans and elevations of 3D shapes | |  |  |  |  |
| SK.37 | Interpret and use bearings | |  |  |  |  |
| SK.38 | Calculate arc lengths, angles and areas of sectors of circles | |  |  |  |  |
| SK.39 | Calculate surface areas and volumes of spheres, pyramids, cones and composite solids | |  |  |  |  |
| SK.40 | Apply the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures | |  |  |  |  |
| SK.41 | Apply Pythagoras’ Theorem and trigonometric ratios to find angles and lengths in right-angled triangles and, where possible, general triangles in two and three dimensional figures | |  |  |  |  |
| SK.42 | Know the exact values of sin θ and cos θ for θ = 00, 300, 450 600 and 900, know the exact value of tan θ for θ = 00, 300, 450 600 and 900 | |  |  |  |  |
| SK.43 | Know and apply the sine rule, , and cosine rule, a2 = b2 + c2 -2bc cos A, to find unknown lengths and angles | |  |  |  |  |
| SK.44 | Know and apply Area = to calculate the area, sides or angles of any triangle | |  |  |  |  |
| SK.45 | Describe translations as 2D vectors | |  |  |  |  |
| SK.46 | Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; use vectors to construct geometric arguments and proofs | |  |  |  |  |
| Probability | | | | | | |
| SK.47 | apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one | |  |  |  |  |
| SK.48 | use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size | |  |  |  |  |
| SK.49 | calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions | |  |  |  |  |
| SK.50 | calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams | |  |  |  |  |
| Statistics | | | | | | |
| SK.51 | infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling | |  |  |  |  |
| SK.52 | interpret and construct tables and line graphs for time series data | |  |  |  |  |
| SK.53 | construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use | |  |  |  |  |
| SK.54 | interpret, analyse and compare the distributions of data sets from univariate empirical distributions | |  |  |  |  |
| SK.55 | apply statistics to describe a population | |  |  |  |  |
| SK.56 | use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing | |  |  |  |  |

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| **Subject Area:** | | **Mathematics** | | **Baseline** | | **Autumn** | | | **Spring** | | **Summer** | | |
| **Subject-Specific Pedagogy** | | | | | | | | | | | | | |
| **Knowledge of Subject Specific Pedagogy** | | | | | | | | | | | | | |
| SSP.1 | Understanding the importance for a Maths department to have a clear curriculum intent | |  | |  | | |  | | | |  | |
| SSP.2 | How to ensure precise and correct use of mathematical language | |  | |  | | |  | | | |  | |
| SSP.3 | How to lead a class discussion around key mathematical concepts | |  | |  | | |  | | | |  | |
| SSP.4 | How to build on prior knowledge, encouraging students to make links and connections | |  | |  | | |  | | | |  | |
| SSP.5 | How to break down complex Maths content/skills/tasks into smaller steps | |  | |  | | |  | | | |  | |
| SSP.6 | How to sequence a Maths lesson / series of lessons to move from foundational knowledge to more complex content? | |  | |  | | |  | | | |  | |
| SSP.7 | How to anticipate and address misconceptions in Maths / How to answer students’ questions | |  | |  | | |  | | | |  | |
| SSP.8 | How to scaffold Maths activities to make new knowledge more accessible / How to differentiate complex topics to higher and lower-ability students | |  | |  | | |  | | | |  | |
| SSP.9 | How to present, model, give examples / clear explanations for and clarify key mathematical concepts | |  | |  | | |  | | | |  | |
| SSP.10 | How to advise a group or individual on how to improve their skill level in your subject | |  | |  | | |  | | | |  | |
| SSP.11 | How to extend 'general knowledge' about subject, including cross-curricular links historical and multi-cultural aspects | |  | |  | | |  | | | |  | |
| SSP.12 | Exploring alternative approaches | |  | |  | | |  | | | |  | |
| SSP.13 | Improving problem solving and proving skills | |  | |  | | |  | | | |  | |
| SSP.14 | Using ICT, including calculators, to encourage productive discussion | |  | |  | | |  | | | |  | |
| SSP.15 | How confident would you be to lead a class of children in a mental starter activity? | |  | |  | | |  | | | |  | |
| SSP.16 | How confident would you be to lead a class of pupils in an oral mental test? | |  | |  | | |  | | | |  | |
| **Knowledge of Subject Assessment & Development** | | | | | | | | | | | | | |
| SAD.1 | How confident would you be in assessing students’ knowledge and understanding of Maths? | |  | |  | | |  | | | |  | |
| SAD.2 | How confident would you be in assessing students’ skill development in Maths? | |  | |  | | |  | | | |  | |
| SAD.3 | How confident are you in deploying formative assessment strategies linked to lesson objectives during lessons (incl. hinge questions to pinpoint knowledge gaps, self and peer-assessment, etc.)? | |  | |  | | |  | | | |  | |
| SAD.4 | How confident would you be to write a Maths summative assessment on a topic chosen by the subject mentor, choosing, where possible, externally validated materials? | |  | |  | | |  | | | |  | |
| SAD.5 | How confident are you in using data (assessment, homework, etc.) to inform your planning? | |  | |  | | |  | | | |  | |
| SAD.6 | How confident are you in using data to set appropriate targets? | |  | |  | | |  | | | |  | |
| SAD.7 | How confident are you in planning for progression (short, medium and long-term)? | |  | |  | | |  | | | |  | |
| SAD.8 | Some schools teach Maths in mixed ability groups. How confident are you that you can involve every pupil in the learning process? | |  | |  | | |  | | | |  | |
| SAD.9 | How confident are you in checking prior knowledge to identify knowledge gaps and misconceptions? | |  | |  | | |  | | | |  | |
| SAD.10 | How confident are you in drawing conclusions about what pupils have learned by looking at patterns of performance over a number of assessments to inform future planning? | |  | |  | | |  | | | |  | |
| SAD.11 | How confident are you in assessing written answers to questions and identifying ways of improving the answer given through high-quality feedback and specific actions? | |  | |  | | |  | | | |  | |
| SAD.12 | How confident are you in making marking manageable and effective? (incl. use of verbal feedback, whole-class feedback, abbreviations, codes, peer-self-assessment, error highlighting, etc.) | |  | |  | | |  | | | |  | |
| SAD.13 | How secure is your knowledge of the Maths A-Level Content and Assessment Objectives? | |  | |  | | |  | | | |  | |
| SAD.14 | How secure is your knowledge of the Maths GCSE Content and Assessment Objectives? | |  | |  | | |  | | | |  | |
| SAD.15 | How would you rate your understanding of the 9-1 grades in Maths? | |  | |  | | |  | | | |  | |
| SAD.16 | How confident would you be in assessing students’ soft skills such as resilience, teamwork, empathy, fairness and collaboration in your subject? | |  | |  | | |  | | | |  | |
| **Child & Adolescent Development within your Subject** | | | | | | | | | | | | | |
| CAD.1 | How do you feel about creating effective learning environments? | | |  |  | | |  | | | |  | |
| CAD.2 | How do you feel about securing all pupils’ motivation and concentration? | | |  |  | | |  | | | |  | |
| CAD.3 | How confident are you creating challenging learning opportunities and promoting high aspirations for all learners, especially those from a disadvantaged background? | | |  |  | | |  | | | |  | |
| CAD.4 | How confident are you implementing effective strategies to engage students with behavioural, mental health or SEN within Maths? | | |  |  | | |  | | | |  | |
| CAD.5 | How confident are you working with pupils who may be disaffected in Maths lessons and raising their level of engagement and motivation? | | |  |  | | |  | | | |  | |
| CAD.6 | How confident are you building pupils’ confidence to attempt more complex tasks / multi-step problems. | | |  |  | | |  | | | |  | |
| CAD.7 | How confident are you at creating competitive and celebratory opportunities for students in your subject? | | |  |  | | |  | | | |  | |
| CAD.8 | How confident are you supporting out-of-classroom Maths learning (e.g. through your extra-curricular involvement) to increase participation in your subject and contribute to the holistic development of your students? | | |  |  | | |  | | | |  | |
| CAD.9 | How confident are you promoting effective behaviour for learning from students? | | |  |  | | |  | | | |  | |
| CAD.10 | How confident are you engaging parents in your students’ learning? | | |  |  | | |  | | | |  | |
| **Professional Skills (Literacy & Numeracy)** | | | | | | | | | | | | | |
| PS.1 | Own literacy skills *(see detail of requirements on CTTP Teams VLE >> Library >> Professional Skills)* | | |  | | |  | | |  | | |  |
| PS.2 | Ability to support the development of students’ literacy within Maths. | | |  | | |  | | |  | | |  |
| PS.3 | Own numeracy skills *(see detail of requirements on CTTP Teams VLE >> Library >> Professional Skills)* | | |  | | |  | | |  | | |  |
| PS.4 | Ability to support the development of students’ numeracy within Maths. | | |  | | |  | | |  | | |  |
| **Effective Use of ICT** | | | | | | | | | | | | | |
| ICT.1 | Word | | |  |  | | |  | | | |  | |
| ICT.2 | Excel | | |  |  | | |  | | | |  | |
| ICT.3 | PowerPoint | | |  |  | | |  | | | |  | |
| ICT.4 | Interactive Whiteboard | | |  |  | | |  | | | |  | |
| ICT.5 | School’s Online Learning Platform (Teams, Google Classroom, SharePoint, etc.) | | |  |  | | |  | | | |  | |
| ICT.6 | School’s Systems (SIMS, CPOMS, Class Charts, etc.) | | |  |  | | |  | | | |  | |
| ICT.7 | Understanding of e-Safety and how to support it | | |  |  | | |  | | | |  | |
| ICT.8 | How to use ICT in the classroom to raise engagement and support the individual? | | |  |  | | |  | | | |  | |
| ICT.9 | How to use ICT and online resources to help manage your workload? | | |  |  | | |  | | | |  | |
| ICT.10 | How to deliver an effective remote lesson / blended lesson? | | |  |  | | |  | | | |  | |

SK Development  
Subject Knowledge Day Compulsory Reading

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| --- | --- | --- | --- | --- |
| **SK Day 1** |  | **Mathematics programmes of study: key stage 3**, DfE, 2013 □  <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239058/SECONDARY_national_curriculum_-_Mathematics.pdf>  **Mathematics programmes of study: key stage 4**, DfE, 2014 □  <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/331882/KS4_maths_PoS_FINAL_170714.pdf> |  | **AQA Glossaries** □□  *GCSE Command Words*  <https://www.aqa.org.uk/resources/mathematics/gcse/mathematics-8300/teach/command-words>  *A-Level Command Words*  **\***<https://filestore.aqa.org.uk/resources/mathematics/AQA-7356-7357-CW.PDF>  *A-Level Subject-Specific Vocabulary*  <https://www.aqa.org.uk/resources/mathematics/as-and-a-level/teach/subject-specific-vocabulary> |
| **SK Day 2** |  | **Mathematics GCSE subject content and assessment objectives**, DfE, 2013 □□  *GCSE subject criteria set out the knowledge, understanding, skills and assessment objectives common to all GCSE specifications in a given subject. They provide the framework within which awarding organisations create the detail of their specifications, so ensuring progression from key stage 3 national curriculum requirements and the possibilities for development into advanced-level study.*  <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/254441/GCSE_mathematics_subject_content_and_assessment_objectives.pdf> |  | **Mathematics AS and A level content**, DfE, 2016 □□  *AS and A level subject content sets out the knowledge, understanding and skills common to all AS and A level specifications in mathematics.*  <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/516949/GCE_AS_and_A_level_subject_content_for_mathematics_with_appendices.pdf> |
| **SK Day 3** |  | **Including pupils with SEN and/or disabilities in secondary mathematics**, TDA, 2009 □  *This booklet gives tutors and trainees information about subject-specific issues in the mathematics curriculum for students with SEN and/or disabilities. It offers a straightforward introduction to planning inclusive mathematics lessons.*  https://dera.ioe.ac.uk/13799/1/mathematics.pdf |  | **Access and engagement in mathematics Teaching pupils for whom English is an additional language**, Department for Education and Skills, 2002 □  *The guidance is in two parts. Sections 1 to 4 are intended for subject leaders of Mathematics and ethnic minority achievement (EMA) in secondary schools. These sections are designed to support a departmental meeting focused on reviewing the attainment of pupils learning English as an additional language (EAL), and should be read in conjunction with the later sections. Sections 5 to 8 are for all Mathematics teachers and their EMA colleagues. They aim to help teachers support pupils learning EAL in the classroom, particularly those working at levels 3 to 4 and who have been learning in English for a minimum of two years, in order to raise their attainment in Mathematics lessons.*  http://www.naldic.org.uk/Resources/NALDIC/Teaching%20and%20Learning/ma\_eal.pdf |
| **SK Day 4** |  | **Refocusing Assessment mathematics,** NFER, 2017 □  *SSAT, ASCL and NFER have worked together to produce Refocusing Assessment, which is a resource to support schools in developing and reviewing their assessment practice.*  <https://www.nfer.ac.uk/publications/GTGA01/maths.pdf> |  | **Reading set by the SK Tutor**  Record details of the reading set below: |

SK Development  
Task Bank

|  |  |  |
| --- | --- | --- |
| **Subject Area:** | Mathematics | **Knowledge and Understanding Development Tasks** |

**Task 1: KS3 & KS4 Areas for Development – Oak National Academy**

Identify areas of the subject that you wish to develop and find corresponding lessons at <https://www.thenational.academy/>

Record the lessons completed below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Topics** | **Quiz Score** | **Written Answers** | **Notes (New Knowledge)** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
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Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- |
| **Subject Area:** | Mathematics | **Knowledge and Understanding  Development Tasks** |

**Task 2: KS3 & KS4 Areas for Development – Research & Mindmap**

Identify an area of the subject that you wish to develop and research it using a range of reliable sources.

Record your sources.

|  |
| --- |
|  |

Produce a mindmap of your findings including key facts, concepts, terminology, examples and skills (as relevant).

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|  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Subject Area:** | Mathematics | **Subject-Specific Pedagogy  Development Tasks** |

**Task 3: KS3 & KS4 Areas for Development – Lesson Resources**

Identify an area of the subject that you wish to develop and research it using a range of reliable sources.

Record your sources.

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|  |

Produce a resource on the topic (worksheet, card sort activity, PowerPoint, movie, etc.).



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Subject Area:** | Mathematics | **Knowledge and Understanding  Development Tasks** |

**Task 4: GCSE Content**

Complete a Specimen or Past GCSE Paper and self-assess your answers using the mark scheme. You may refer to your Self-Directed Study Material booklet. Identify the following:

|  |  |  |
| --- | --- | --- |
|  | **Strengths** | **Areas for Development** |
| **Topic(s)** |  |  |
| **Skill(s)** |  |  |
| **Knowledge** |  |  |
| **Question Type(s)** |  |  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- |
| **Subject Area:** | Mathematics | **Knowledge and Understanding  Development Tasks** |

**Task 5: A-Level Content**

Complete a Specimen or Past A-Level Paper and self-assess your answers using the mark scheme. You may refer to your Self-Directed Study Material booklet. Identify the following:

|  |  |  |
| --- | --- | --- |
|  | **Strengths** | **Areas for Development** |
| **Topic(s)** |  |  |
| **Skill(s)** |  |  |
| **Knowledge** |  |  |
| **Question Type(s)** |  |  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- |
| **Subject Area:** | Mathematics | **Knowledge and Understanding  Development Tasks** |

**Task 6: National Curriculum & Departmental Scheme of Work**

Look at the National Curriculum for your subject as well as your department’s scheme of work. Reflect on how the Scheme of Work meet the requirements of the National Curriculum.

|  |  |  |
| --- | --- | --- |
|  | **National Curriculum**  **Programme of Study** | **Departmental**  **Scheme of Work** |
| Aims |  |  |
| Content |  |  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Subject Area:** | Mathematics | **Subject-Specific Pedagogy  Development Tasks** |

**Task 7: Academic Reading**

Select a book / article on an aspect of pedagogy that you wish to develop. You may refer to your Self-Directed Study Material booklet. Consider the following:

|  |
| --- |
| Title: |

**7.1.** What do you already know on the topic?

|  |
| --- |
|  |

**7.2.** What are the key ideas/concepts/terms introduced in the book / article?

|  |
| --- |
|  |

**7.3.** What are the key classroom strategies presented?

|  |
| --- |
|  |

**7.4.** How does it relate to your current experience in the classroom?

|  |
| --- |
|  |

**7.5.** How is this reading going to impact on your classroom practice?

|  |
| --- |
|  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Subject Area:** | Mathematics | **Subject-Specific Pedagogy  Development Tasks** |

**Task 8: Resource Analysis**

Select a lesson on a topic of your choice from your subject’s section at the Oak National Academy <https://www.thenational.academy/>. Consider the following:

|  |  |
| --- | --- |
| **Points for Consideration** | **Teaching Strategies** |
| **8.1.** How are the learning goals and expected outcomes of the lessons shared with the students? |  |
| **8.2.** How are success criteria shared with the students? |  |
| **8.3.** How is prior knowledge activated? |  |
| **8.4.** How is new content introduced? How much new information is introduced? |  |
| **8.5.** How are instructions made clear and explicit to the students? |  |
| **8.6.** How are explanations given and chunked? |  |
| **8.7.** How is the expected standard modelled? |  |
| **8.8.** How are tasks broken into sequential components? |  |
| **8.9.** How are independent practice opportunities built into the lessons? |  |
| **8.10.** How are time frames/word counts suggested to students? |  |
| **8.11.** How are tasks differentiated to cater for various abilities? |  |
| **8.12.** How are tasks scaffolded to allow all students to access the learning? |  |
| **8.13.** How is feedback given? |  |
| **8.14.** How do they anticipate and address students’ misconceptions? |  |
| **8.15.** How is self-assessment facilitated using success criteria? |  |
| **8.16.** How is the content of the following lessons introduced? |  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Subject Area:** | Mathematics | **Subject-Specific Pedagogy  Development Tasks** |

**Task 9: Lesson Observation & Subject/Curriculum Knowledge**

During your observation period in school, write a short reflection on each of the following.

|  |  |
| --- | --- |
| **Points for Consideration** | **Teaching Strategies** |
| **9.1.** How is students’ prior knowledge taken into account? |  |
| **9.2.** How is students’ attention focused on the content (e.g. complexity of the task kept to a minimum)? |  |
| **9.3.** How is complex material broken into smaller steps? |  |
| **9.4.** How is the lesson sequenced to move from foundational knowledge to more complex content? |  |
| **9.5.** How are misconceptions anticipated and addressed? |  |
| **9.6.** How are students allowed to review and practice key ideas and concepts over time? |  |
| **9.7.** How is learning scaffolded to make new knowledge more accessible? |  |
| **9.8.** How are modelling, examples and explanations used to structure new learning? |  |



Task completed:

**Signed**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Trainee) **Date**: \_\_\_\_\_\_\_\_\_\_\_

Evidence of SK Development  
Secondary Subject-Knowledge Development

**What work have you done to develop your subject knowledge?**Evidence what you did to improve your subject knowledge in the boxes below.

|  |  |  |
| --- | --- | --- |
| **Term 1** | September/ October | November/ December |
|  |  |

|  |  |  |
| --- | --- | --- |
| **Term 2** | January/ February | March/ April |
|  |  |

|  |  |  |
| --- | --- | --- |
| **Term 3** | May/ June | June/ July |
|  |  |

Notes:

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Trainee) Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Mentor) Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Trainer) Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

Guidance Notes & Definitions  
Appendix A

**Subject Knowledge Development**

*Evidence suggests that a high level of subject expertise is a characteristic of good teaching (Sadler and others, 2013 and Hill and others, 2005)*.

The Carter Review of ITT (2014) believes that though many ITT entrants will begin their courses with sound subject knowledge, ITT must nevertheless systematically address gaps and misconceptions in core subject knowledge. They have found that in some cases, there can be a perception, often from trainees themselves, that they begin ITT with all of the content knowledge they will need and that ITT only needs to teach new teachers how to translate that knowledge effectively. For example, evaluations from subject knowledge enhancement courses show trainees begin courses believing they have a reasonable level of subject knowledge in their subject of study, but after the course recognise that they over-estimated their levels of understanding of their subject (Department for Education (DfE), 2013).

Addressing subject knowledge systematically is important across all subjects. For secondary teachers a degree will form an important basis but not a guarantee of good subject knowledge across the breadth of the national curriculum in their subject.

They have found that these challenges mean it is important for subject knowledge to be treated as a priority in ITT. They consider the following practices as characteristics of effective teaching to address subject knowledge development:

n **Subject knowledge development should be addressed systematically**, through a process of auditing and tracking with specific on-going input to address subject knowledge gaps. There is a range of online tools provided by subject associations as well as subject knowledge specifications that can support this process.

n **Subject knowledge development in ITT should be sharply focused on “subject knowledge for teaching”**; it should focus on the content knowledge and concepts required to deliver the national curriculum and exam syllabi where relevant, ensuring that content reflects any changes to these. Emphasis should also be put on exploration of the importance of the subject and why it matters to the learner now and in the future.

n **Trainees need access to high-quality subject expertise** – making systematic use of subject expertise in schools (such as Specialist Leaders in Education (SLEs)), and cross-phase expertise in some cases.

The Teachers’ Standards require trainees to demonstrate good subject knowledge. Subject knowledge is an area that all teachers must continue to review and develop throughout their career. As such, ITT providers should instil an expectation and appetite for on-going development of subject knowledge beyond ITT and throughout a teacher’s career. Directing trainees towards subject communities and networks, as well as resources from subject associations, is a helpful way of supporting this.

**Subject-Specific Pedagogy**

*There is evidence to suggest that teachers who understand how pupils think about subjects, including their common misconceptions, are more likely to have a positive impact on pupil outcomes (Sadler and others, 2013 and Hill and others, 2005).*

The Carter Review of ITT (2014) believe that ITT programmes should address subject-specific issues, including phases of progression within the subject, linkages between subjects as well as common misconceptions and how to address them, as well as develop confidence in practical issues relating to their subject (for example, experiments in science and use of equipment in Design and Technology).

Providers and schools have also told us that it is important that both trainers and mentors have a strong grasp of subject-specific pedagogy. This relates to the issues above about trainees having access to sufficient subject expertise.

**Subject Knowledge in the ITT Core Content Framework**

n **Trainees must learn that…**

* Secure subject knowledge helps teachers to motivate pupils and teach effectively.
* Anticipating common misconceptions within particular subjects is also an important aspect of curricular knowledge.
* Explicitly teaching pupils the knowledge and skills they need to succeed within particular subject areas is beneficial.
* In order for pupils to think critically, they must have a secure understanding of knowledge within the subject area they are being asked to think critically about.

n **Trainees must learn how to…**

* Identify essential concepts, knowledge, skills and principles of the subject.
* Ensure pupils’ thinking is focused on key ideas within the subject.
* Provide opportunity for all pupils to learn and master essential concepts, knowledge, skills and principles of the subject.
* Use resources and materials aligned with the school curriculum (e.g. textbooks or shared resources designed by expert colleagues that carefully sequence content).
* Extend subject and pedagogic knowledge as part of the lesson preparation process.