

Computing 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):

- | | | |
|--------------------------|----------------------|---|
| <input type="checkbox"/> | 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) |
| <input type="checkbox"/> | 3 Expected | Some knowledge in this area and/or limited experience and in need of further development |
| <input type="checkbox"/> | 2.5 Expected+ | Developing knowledge / growing experience in this area |
| <input type="checkbox"/> | 2 Good | Good knowledge in this area and /or some experience |
| <input type="checkbox"/> | 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 15



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 16



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 25



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 26



Subject Area:	Computing	Baseline	Autumn	Spring	Summer
Subject Knowledge & Understanding					
Computational Thinking					
CT.1	Principles of computational Thinking: <ul style="list-style-type: none"> • Abstraction • Decomposition • Algorithmic Thinking 				
Algorithms					
A.1	Identify the inputs, processes and outputs for a problem.				
A.2	Create, interpret, correct complete and refine algorithms using: <ul style="list-style-type: none"> • Pseudocode • Flowcharts • Reference language / High-level Programming language 				
A.3	Identify common errors and use trace tables.				
A.4	Know and be able to implement standard algorithms including: <ul style="list-style-type: none"> • linear search • binary search • bubble sort • insertion sort • quick sort (option at A Level) • merge sort 				
A.5	Follow algorithms to solve problems including sequence, selection and iteration				
A.6	Write algorithms to solve problems including sequence, selection and iteration				
A.7	Be able to explain how particular programs work when given their code				
A.8	Be able to explain how particular algorithms work				
A.9	Be able to use: <ul style="list-style-type: none"> • Common arithmetic operators • Common Boolean operators 				
Data					



D.1	<p>Know and be able to implement data types including:</p> <ul style="list-style-type: none"> • integers • Booleans • real • string 				
D.2	<p>Know and be able to implement data structures including:</p> <ul style="list-style-type: none"> • records, • one-dimensional arrays • two-dimensional arrays 				
D.3	<p>Be able to explain the representation of numbers in:</p> <ul style="list-style-type: none"> • binary • hexadecimal 				
D.4	<p>Be able to use binary numbers:</p> <ul style="list-style-type: none"> • Binary addition • Binary shift 				
D.5	Be able to explain the use of binary and hexadecimal numbers effectively.				
D.6	<p>Be able to convert numbers between</p> <ul style="list-style-type: none"> • binary and decimal • hexadecimal and decimal • binary and hexadecimal <p>both directions.</p>				
D.7	Be able to add two binary numbers and explain any overflow errors.				
D.8	Be able to explain the representation of text in binary and hexadecimal. (ASCII / Unicode) including the term 'character set'.				
D.9	Be able to explain the representation of sound in computer systems.				
D.10	Be able to explain the effect of sample rate, duration and bit depth on playback quality and sound file size.				
D.11	Be able to explain the representation of graphics/images in computer systems. Including metadata.				
D.12	Be able to explain the effect of colour depth and resolution on image quality and image file size.				
D.13	Be able to explain the need for compression and the difference between lossy and lossless compression.				



Logic					
L.1	Be able to explain Boolean logic including AND, OR and NOT				
L.2	Be able to use Boolean logic including AND, OR and NOT				
L.3	Be able to apply Boolean logic to truth tables to solve specific problems				
Software					
S.1	Be able to explain the purpose and functionality of different operating systems. (UI, Memory, Peripheral, User, File)				
S.2	Be able to explain the purpose and functionality of different utility software. (Encryption, Defragmentation, Compression,				
Systems Architecture					
SA.1	Be able to explain Von Neumann architecture. Including: <ul style="list-style-type: none"> • Registers: <ul style="list-style-type: none"> ○ Memory Data Register (MDR) ○ Memory Address Register (MAR) ○ Program Counter (PC) ○ Accumulator (ACC) • Cache, • Control Unit (CU) • Arithmetic and Logic Unit (ALU) 				
SA.2	Be able to explain the fetch-decode-execute cycle.				
SA.3	Be able to explain the role of the components in the fetch-execute cycle				
SA.4	Be able to explain the need for primary storage.				
SA.5	Be able to explain the purposes of and difference between RAM and ROM				
SA.6	Be able to explain the role of Virtual Memory in computer systems.				
SA.7	Be able to explain how computer storage works: <ul style="list-style-type: none"> • Magnetic • Optical • Solid State 				



SA.8	Be able to explain positives and negatives of computer storage with regard to: <ul style="list-style-type: none"> • Speed • Durability • Cost • Capacity • Portability • Reliability 				
SA.9	Be able to explain how secondary storage works and the role it plays within the running of a computer system.				
SA.10	To know the units of data storage: <ul style="list-style-type: none"> • Bit • Nibble (4 bits) • Byte (8 bits) • Kilobyte (1,000 bytes or 1 KB) • Megabyte (1,000 KB) • Gigabyte (1,000 MB) • Terabyte (1,000 GB) • Petabyte (1,000 TB) 				
SA.11	Explain what data capacity is and the effects it has on operating systems				
SA.12	Be able to perform calculations to predict data capacity requirements				
SA.13	Be able to name and explain the purpose of a range of hardware devices. <ul style="list-style-type: none"> • Input • Output 				
SA.14	Be able to explain in detail the role of embedded systems and how they work.				

Networks

N.1	Explain how a wired network connection works.				
N.2	Explain how a wireless network connection works.				
N.3	Explain a range of different network types: <ul style="list-style-type: none"> • LAN • WAN • Client-Server • Peer-to-Peer 				
N.4	Explain factors that affect the performance of networks e.g. number of devices connected, bandwidth				



N.5	<p>Explain the advantages and disadvantages of the most common network topologies including but not limited to:</p> <ul style="list-style-type: none"> • mesh • star, • ring and • bus networks 				
N.6	Explain the vulnerabilities that are present in networked computers.				
N.7	<p>Explain the principles of network security and how to implement them.</p> <ul style="list-style-type: none"> • network policies • anti-malware software • firewalls • user access levels • passwords • encryption 				
N.8	Explain the concept of Ethernet				
N.9	Explain the concept of Wi-Fi				
N.10	<p>Explain the concept of:</p> <ul style="list-style-type: none"> • IP addressing, • MAC addressing, 				
N.11	Explain the concept of Standards.				
N.12	<p>Explain the concept protocols including:</p> <ul style="list-style-type: none"> • TCP/IP (Transmission Control Protocol/Internet Protocol) • HTTP (Hyper Text Transfer Protocol) • HTTPS (Hyper Text Transfer Protocol Secure) o FTP (File Transfer Protocol) • POP (Post Office Protocol) • IMAP (Internet Message Access Protocol) • SMTP (Simple Mail Transfer Protocol) 				
N.13	<p>Explain the <u>concept</u> of network layers</p> <p>E.g. OSI</p> <ul style="list-style-type: none"> • Physical • Data • Network • Transmission 				



	<ul style="list-style-type: none"> • Session • Presentation • Application <p>OR TCP/IP</p> <ul style="list-style-type: none"> • Application • Transport • Internetwork • Link <p>Though not needing to name them.</p>				
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Cyber Security

CS.1	<p>Be able to explain different forms of attacks:</p> <ul style="list-style-type: none"> • Malware • Phishing • Social Engineering • Brute Force Attack • Denial of Service Attack • Data Interception and Theft • Concept of SQL Injection • Poor Network policy 				
CS.2	<p>Be able to explain methods of identifying vulnerabilities and preventing attacks:</p> <ul style="list-style-type: none"> • penetration testing • network forensics • Anti-malware software • Firewalls • User Access levels • Passwords • Encryption • Physical Security 				
CS.3	<p>Be able to explain ways to protect software system during design, creation, testing and use</p>				

Digital Technology Issues

DTI.1	<p>Explain ethical issues surrounding digital technology.</p>				
DTI.2	<p>Explain cultural issues surrounding digital technology.</p>				
DTI.3	<p>Explain legal issues surrounding digital technology:</p> <ul style="list-style-type: none"> • Data Protection Act • Computer Misuse Act • Freedom of Information Act 				



	<ul style="list-style-type: none"> Copyright Design and Patents Act 				
DTI.4	Explain the environmental impacts of digital technology: <ul style="list-style-type: none"> Green IT Paperless Office Reduction of Computer Waste 				
DTI.5	Explain the issues of privacy and cyber security surrounding digital technology				
Programming					
P.1	Explain the characteristics of high-level programming languages				
P.2	Explain the characteristics of low-level programming languages				
P.3	Explain the use and need of high-level programming languages				
P.4	Explain the use and need of low-level programming languages				
P.5	The purpose and characteristics of translators (compilers / interpreters)				
P.6	Know common tools and facilities available in an integrated development environment (IDE) <ul style="list-style-type: none"> Editors Error diagnostic Run-time environment Translator 				
P.7	Be able to program competently in two programming languages, at least one of which must be a text-based language.				
P.8	Use correct data types when programming: <ul style="list-style-type: none"> Integer Real Boolean Character and String Casting 				
P.9	Use basic string manipulation				
P.10	Use basic file handling operations: <ul style="list-style-type: none"> Open Read Write Close 				

P.11	Use of records to store data				
P.12	Use of SQL to search for data (SELECT....FROM....WHERE)				
P.13	The use of one-dimensional and two-dimensional arrays				
P.14	How to use sub-programs to structure code				
P.15	Random number generation				
P.16	Purpose and types of testing <ul style="list-style-type: none"> • Iterative • Final/terminal 				
P.17	Identifying syntax and logical errors.				
P.18	Selecting and using suitable test data <ul style="list-style-type: none"> • Normal • Boundary / Extreme • Invalid • Erroneous 				
Digital Literacy and ICT					
DL.1	Databases (e.g. MS Access.)				
DL.2	Spreadsheets (e.g. MS Excel)				
DL.3	Word Processing (e.g. MS Word)				
DL.4	DTP (e.g. MS Publisher)				
DL.5	Presentation (e.g. MS PowerPoint)				
DL.6	Web Design and Creation (e.g. Adobe Dreamweaver)				
DL.7	Video editing (e.g. MS Movie Maker)				
DL.8	Sound Editing (e.g. Audacity, Adobe Audition)				
DL.9	Graphics (e.g. Adobe Fireworks/Photoshop)				
DL.10	Other additional software (please add.)				

Subject Area:	Computing	Baseline	Autumn	Spring	Summer
Subject-Specific Pedagogy					
Knowledge of Subject Specific Pedagogy					
SSP.1	Understanding the importance for a Computing department to have a clear curriculum intent				
SSP.2	How to ensure precise and correct use of subject-specific language				
SSP.3	How to lead a class discussion around key Computing concepts				
SSP.4	How to build on prior knowledge, encouraging students to make links and connections				
SSP.5	How to break down complex Computing content/skills/tasks into smaller steps				
SSP.6	How to sequence a Computing lesson / series of lessons to move from foundational knowledge to more complex content?				
SSP.7	How to anticipate and address misconceptions in Computing / How to answer students' questions				
SSP.8	How to scaffold Computing 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 Computing 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	Understand and explain the link between literacy and the ability to program effectively in a text-based language				
Knowledge of Subject Assessment & Development					



SAD.1	How confident would you be in assessing students' knowledge and understanding of Computing?				
SAD.2	How confident would you be in assessing students' skill development in Computing?				
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 Computing 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 Computing 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 Computing A-Level Content and Assessment Objectives?				
SAD.14	How secure is your knowledge of the Computing GCSE Content and Assessment Objectives?				
SAD.15	How would you rate your understanding of the 9-1 grades in Computing?				
SAD.16	How confident would you be in assessing students' soft skills such as resilience, teamwork, empathy, fairness and collaboration in your subject?				
SAD.17	Know how to analyse code, identify problems and suggest ways of improving the coding techniques that have been implemented				
SAD.18	Be able to progress students from programming effectively in visual programming languages to programme effectively in text-based programming languages				
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 Computing?				
CAD.5	How confident are you working with pupils who may be disaffected in Computing 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 Computing 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?				
CAD.11	How confident are you ensuring that student's knowledge of E-safety is appropriate for their age				
CAD.12	How confident are you ensuring that students are able to apply E-safety relevant to their age				
CAD.13	How confident are you ensuring that students know how to manage their use of ICT equipment safely and effectively				
CAD.14	Having an effective awareness of the opportunities and challenges of mental health and socio-emotional issues that can occur with the use of ICT				
Professional Skills (Literacy & Numeracy)					
PS.1	Own literacy skills (<i>see detail of requirements on CTTT Teams VLE >> Library >> Professional Skills</i>)				
PS.2	Ability to support the development of students' literacy within Computing.				
PS.3	Own numeracy skills (<i>see detail of requirements on CTTT Teams VLE >> Library >> Professional Skills</i>)				
PS.4	Ability to support the development of students' numeracy within Computing.				
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

SK Day 1	 <p>Computing programmes of study: key stages 3 and 4, DfE, 2013</p> <p>□ <i>A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.</i></p> <p>https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239067/SECONDARY_national_curriculum_-_Computing.pdf</p>	 <p>AQA Glossaries □□ <i>GCSE Subject-Specific Vocabulary</i> *https://filestore.aqa.org.uk/resources/computing/AQA-8525-SSV.PDF <i>A-Level Command Words</i> https://www.aqa.org.uk/resources/computer-science-and-it/as-and-a-level/computer-science-7516-7517/teach/command-words <i>A-Level Subject-Specific Vocabulary</i> https://www.aqa.org.uk/resources/computer-science-and-it/as-and-a-level/computer-science-7516-7517/teach/subject-specific-vocabulary</p>
SK Day 2	 <p>Computer science GCSE subject content, DfE, 2015 □□ <i>The GCSE subject content sets out the knowledge, understanding and skills common to all GCSE specifications in a given subject. Together with the assessment objectives it provides the framework within which the awarding organisations create the detail of their specifications, so ensuring progression from key stage 3 national curriculum requirements and the possibilities for development into A level.</i></p> <p>https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/397550/GCSE_subject_content_for_computer_science.pdf</p>	 <p>GCE AS and A level subject content for computer science, DfE, 2014 □□ <i>AS and A level subject content sets out the knowledge, understanding and skills common to all AS and A level specifications in computer science.</i></p> <p>https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/302105/A_level_computer_science_subject_content.pdf</p>
SK Day 3	 <p>Including students with SEN and/or disabilities in secondary ICT, TDA, 2009 □ <i>This booklet gives tutors and trainees information about subject-specific issues in the ICT curriculum for students with SEN and/or disabilities. It offers a straightforward introduction to planning inclusive ICT lessons.</i></p> <p>https://dera.ioe.ac.uk/13797/1/informationandcommunicationtechnologyict.pdf</p>	 <p>Access and engagement in ICT Teaching pupils for whom English is an additional language, Department for Education and Skills, 2002 □ <i>The guidance is in two parts. Sections 1 to 4 are intended for subject leaders of ICT 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 ICT 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 ICT lessons.</i></p> <p>http://www.naldic.org.uk/Resources/NALDIC/Teaching%20and%20Learning/0611-2002ICT.pdf</p>
SK Day 4	 <p>Reading set by the SK Tutor Record details of the reading set below:</p>	 <p>Reading set by the SK Tutor Record details of the reading set below:</p>

SK Development

Task Bank

Subject Area:	Computing	Knowledge and Understanding Development Tasks
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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)

Task completed:

Signed: _____ (Trainee)

Date: _____



**Subject Area:**

Computing

**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).

Task completed:

Signed: _____ (Trainee)

Date: _____



**Subject Area:**

Computing

**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.

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

Task completed:

Signed: _____(Trainee)**Date:** _____

Subject Area:

Computing

**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: _____





Subject Area:

Computing

**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: _____



Subject Area:

Computing

**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:

Computing

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:

Computing

**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:	Computing	Subject-Specific Pedagogy Development Tasks
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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.



Carter review of initial teacher training (ITT)

Sir Andrew Carter OBE

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.