

**Scheme of Work 2020- 2021**  
**Subject: Computing – Unit 2 Fundamentals of Computer Systems**

**Year Group: Year 12**  
**Specification: BTEC Computing – Unit 2 – this is to run co-currently as Unit 1 (students have 5 hours a week 2 hours for Unit 1 and 2 hours for Unit 2 and 1 hour self-directed learning)**

| Lesson No | Topic & Objectives   | Big Question – What will students learn? | Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary)   | Planned Assessment   | Homework or flipped learning resources<br><br>DODDLE resources | Lit Num SMSC Codes  |
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| 1 & 2     | <p><b>A1 Computer hardware within a computer system</b></p> <p>Types of computer systems</p> | <p><b>What are computers?</b></p>        | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the unit by explaining that the content will be assessed by a traditional examination and that learners should be able to apply all knowledge within context.</li> <li>• <b>Small-group activity:</b> Learners to brainstorm computer systems that they have experience of/exposure to.</li> <li>• <b>Class discussion:</b> Discuss and share ideas. Facilitate the discussion to highlight the vast range of computer system that learners will interact with daily and how some systems are formed by connecting smaller systems. Learners should consider this in a range of contexts, and across a range of technologies.</li> <li>• <b>Small-group activity:</b> Learners to expand their thoughts and ideas of the systems that they use. They should start to add some of the tasks these systems perform.</li> </ul> | <p>Baseline test</p> <p>An informal quiz about common devices and systems to establish learners' understanding of technical vocabulary</p> | <p>Pg 50 &amp; 51 BTEC Revision book</p>                       | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|       |  |   | <ul style="list-style-type: none"> <li>10 Types of computers:<br/><a href="http://computer.howstuffworks.com/10-types-of-computers10.htm">http://computer.howstuffworks.com/10-types-of-computers10.htm</a></li> </ul>  |   |   |  |
| 3 & 4 | <p><b>A1 Computer hardware within a computer system</b></p> <p>The purpose, features and uses of internal components</p> | <p><b>What is the purpose of internal components?</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson and use Q&amp;A sessions to remind learners of what was covered last lesson.</li> <li><b>Tutor presentation:</b> Introduce the standard internal components of a computer system (CPU, RAM etc.) – you could provide physical examples of components for learners to explore.</li> <li><b>Independent learning activity 1:</b> Learners research and make brief notes on the purpose of each component.</li> <li><b>Independent learning activity 2:</b> Provide learners with a list of additional internal components that may be found in mobile devices (e.g. touch screens, digitisers, accelerometers etc.). Learners research and make notes on their purpose</li> <li>Example internal components.</li> <li>Internal components of the computer:<br/><a href="http://www.slideshare.net/DanielAtkinson96/internal-components-of-the-computer">http://www.slideshare.net/DanielAtkinson96/internal-components-of-the-computer</a></li> </ul> | Written notes that clearly describe each component of a computer system | Pg 147 – 151 PG Online Book   | <p>Lit</p> <p>Social</p> <p>So8<br/>C3<br/>Sp2<br/>Sp5</p> |
| 5 & 6 | <p><b>A1 Computer hardware within a</b></p>  | <p><b>Which internal component and why?</b></p>           | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the purpose of the lesson – to explore the features of internal components</li> </ul>  | Written notes that clearly explain the features and differences of      | Students to carry out research to find as many input and output devices as they can. Students | <p>Lit</p> <p>Social</p> <p>So8</p>                        |

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|       | <p><b>computer system</b></p> <p>The purpose, features and uses of internal components</p> <p>Factors affecting the choice, use and performance of internal components</p> |  | <ul style="list-style-type: none"> <li>• <b>Tutor presentation:</b> Introduce key vocabulary used to describe the features and capabilities of internal components (e.g. volatility, capacity, clock speed)</li> <li>• <b>Independent learning activity 1:</b> Learners conduct independent research on features and functions of internal components.</li> <li>• <b>Independent learning activity 2:</b> Learners research and make notes comparing the features of mobile and traditional computer processors.</li> <li>• <b>Class discussion:</b> Discuss and share findings.</li> </ul>  | mobile and traditional computer processors  | should also write about each device they find – this should be done in preparation for next lesson. | C3<br>Sp2<br>Sp5                                 |
| 7 & 8 | <p><b>A1 Computer hardware within a computer system</b></p> <p>The hardware used in computer systems</p>   | <p><b>What are input and output devices?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson and use Q&amp;A sessions to establish learners' understanding of input, output and storage hardware used in computer systems</li> <li>• <b>Small-group activity:</b> Provide each group with a different, basic scenario/vocational sectors. Learners should use scenarios across different sectors such as education, retail, sport, finance, the creative arts, manufacturing, logistics, tourism, science and medicine. Using research and their own knowledge, each group should prepare a short presentation about the hardware used in these sectors (including purpose, features, benefits and drawbacks).</li> </ul> | Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question – To cover input and output devices | PG Online pg 156  | Lit<br><br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |

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|        |   |                                      | <ul style="list-style-type: none"> <li>• <b>Class activity:</b> Each group to present their findings to the rest of the class. Learners should be prepared to ask questions of each group.</li> </ul>   |   |  |   |
| 9 & 10 | <p><b>A1 Computer hardware within a computer system</b></p> <ul style="list-style-type: none"> <li>• The hardware used in computer systems</li> <li>• How the features of hardware affect their performance and the performance of a computer system</li> </ul> | <p><b>What hardware and why?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the focus of the lesson – to consider the factors that affect performance of hardware and systems. Learners should be given examples of input and output devices used in different vocational sectors, such as technology to monitor sports performance, barcode readers in retail, biometrics in security and graphics tablets in design.</li> <li>• <b>Individual learning activity:</b> Provide learners with a series of tasks detailing different computer hardware and related specifications. Learners should explore how the features and specifications of the hardware would affect how it can perform the identified role (and the impact on the system as a whole). For some scenarios, provide a choice of hardware that learners should discuss.</li> <li>• <b>Small-group activity:</b> In pairs or small groups, learners to discuss and justify the points made in the task.</li> </ul> | Exam style questions to assess the students' knowledge on Hardware – the impact on the systems (in given scenarios) | <p>PG Online Exercises pg 152</p> <p>Students to investigate the ways in which technology can help people with disabilities make full use of computers and assist them in their lives.</p> <p>Visit <a href="http://www.washington.edu/doing/video/index.php?vid=33">http://www.washington.edu/doing/video/index.php?vid=33</a> to find out about the ways in which computers can be adapted to allow people with all kinds of disabilities to make use of all their functions.</p> <p>Ext: Think of other ways in which you think that technology may be able to help people with disabilities in the future.</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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| 11 & 12 | <p><b>A1 Computer hardware within a computer system</b></p> <ul style="list-style-type: none"> <li>• The hardware used in computer systems</li> <li>• How the features of hardware affect their performance and the performance of a computer system</li> <li>• Factors affecting choice of hardware</li> </ul> | <p><b>What choices do I have?</b></p>           | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Discuss the use of computer systems in different scenarios. Introduce the overarching concepts that affect choices in most sectors.</li> <li>• <b>Independent learning activity 1:</b> Learners to conduct independent research on areas that may require additional information (e.g. factors affecting compatibility, testing and migration).</li> <li>• <b>Independent learning activity 2:</b> Provide each group with a vocational scenario. (See lessons 5 and 6 for ideas – additional ideas could include 3D printers used in research and development or sensors used for environmental controls in horticulture and agriculture). Learners should identify how different hardware could be used to meet the needs of the individuals/organisations involved. Learners should justify any decisions made, with reference to topic A1.6.</li> <li>• <b>Guest speaker:</b> A manager or technical support specialist from a vocational sector to give a talk on the use of computer systems. Learners to make notes of their findings and observations</li> </ul> | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question - Tech Assist Question (June 2019 No.3)</p> | <p>Revision sheet: 'Learning aim A hardware &amp; software'</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |
| 13 & 14 | <p><b>A1 Computer hardware within a</b></p>   | <p><b>How can I store and recover data?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the focus of the lesson – to understand the features and uses of data storage and</li> </ul>   | <p>Responses from informal quiz</p>  | <p>A1 Booklet</p>   | <p>Lit<br/>Social<br/><br/>So8</p>                        |

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|         | <p>computer system</p> <ul style="list-style-type: none"> <li>Data storage and recovery systems</li> </ul> |   | <p>recovery systems. Give learners and overview of RAID and NAS.</p> <ul style="list-style-type: none"> <li><b>Individual learning activity:</b> Learners to conduct individual research into the uses, features, benefits and drawbacks of RAID and NAS.</li> <li><b>Class discussion:</b> Discuss and share ideas. Facilitate the discussion by exploring specific vocational scenarios.</li> <li><b>Knowledge quiz:</b> An informal quiz covering key facts related to RAID and NAS.<br/>RAID and NAS quiz.<br/>IT in Three: What is RAID? (4.5 minutes)<br/><a href="https://www.youtube.com/watch?v=AaORTgxJJy8">https://www.youtube.com/watch?v=AaORTgxJJy8</a><br/>Still confused about NAS? NAS explained (4 minutes):<br/><a href="https://www.youtube.com/watch?v=k13sQxybqiA">https://www.youtube.com/watch?v=k13sQxybqiA</a></li> </ul> |   |   | <p>C3<br/>Sp2<br/>Sp5</p>                            |
| 15 & 16 | <p><b>A2 Computer software within a computer system</b></p> <p>Types of operating systems</p>              | <p><b>What is the role of the operating system?</b></p> | <ul style="list-style-type: none"> <li><b>Tutor presentation:</b> Introduce the lesson. Discuss with learners the concept of operating systems, and introduce the different types of operating system in large- and small-scale systems.</li> <li><b>Small-group activity:</b> Provide examples of different types of operating systems on different devices for learners to explore.</li> <li><b>Independent learning activity:</b> Learners to conduct research, into</li> </ul>  | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks - Completion of Exam style questions on Operating Systems</p> | <p>Role of an operating system handout with questions</p> | <p>Lit<br/>Social<br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|         |  |   | <p>the features and roles of different operating systems and how their implementation differs on different devices (e.g. desktop computer OS compared with a mobile OS).</p> <p>Example devices/systems with different OS.</p> <p><a href="http://computer.howstuffworks.com/operating-system3.htm">http://computer.howstuffworks.com/operating-system3.htm</a></p> <p>What is an Operating System as Fast As Possible (5 minutes):</p> <p><a href="https://www.youtube.com/watch?v=pVzRTmdd9j0">https://www.youtube.com/watch?v=pVzRTmdd9j0</a></p> <ul style="list-style-type: none"> <li>• <b>Class discussion:</b> Learners discuss their findings.</li> </ul> |  |   |   |
| 17 & 18 | <p><b>A2 Computer software within a computer system</b></p> <ul style="list-style-type: none"> <li>• Types of operating systems</li> <li>• The role of the kernel in controlling and managing system components and tasks</li> </ul> | <p><b>How does the kernel perform specific tasks?</b></p> | <ul style="list-style-type: none"> <li>• <b>Tutor presentation:</b> Introduce concept of the kernel and its importance as the core of an OS.</li> <li>• <b>Small-group activity 1:</b> Split the class in to at least 8 groups. Assign each group one of the roles of the OS, as listed in topic A2.1.2. As a group, they should prepare a short description highlighting how the kernel performs the specified role/task.</li> <li>• <b>Small-group activity 2:</b> Each group to take turns to present their findings to the rest of the class. Collect the descriptions and combine them into a single resource to share with all learners.</li> </ul>          | <p>Completion of group activity – each group describing 1 role of an operating system – check the outcomes of each group before the groups share their findings with each other.</p> | <p>Learning aim A hardware &amp; software:<br/>Operating system</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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| 19 & 20 | <p><b>A2 Computer software within a computer system</b></p> <ul style="list-style-type: none"> <li>Types of operating systems</li> <li>The role of the kernel in controlling and managing system components and tasks</li> <li>The role of the operating system in managing networking and security</li> </ul> | <p><b>What is the role of the OS in networking and security?</b></p>              | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the focus of the lesson – to understand the how the operating system manages networking and security</li> <li><b>Individual learning activity:</b> Learners to conduct individual research into the role of the OS in networking and security.</li> <li><b>Class discussion:</b> Discuss and share ideas. Facilitate the discussion by exploring specific vocational scenarios.</li> <li><b>Knowledge quiz:</b> A quiz covering key facts related to OS, networking and security.</li> </ul> | <p><b>Knowledge quiz:</b> A quiz covering key facts related to OS, networking and security.</p> | A2 Booklet   | Lit<br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |
| 21 & 22 | <p><b>A2 Computer software within a computer system</b></p> <ul style="list-style-type: none"> <li>Types of operating systems</li> <li>Factors affecting</li> </ul>  | <p><b>Explain the features and implication of using different interfaces.</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Provide learners with opportunities to explore different devices, programs and systems that utilise different types of interface.</li> <li><b>Small-group activity 1:</b> Split the class into at least 4 groups. Assign each group one of the types of interface listed in topic A2.1.4. As a group, they should prepare a short</li> </ul>   | Individual activity - Networking and security (Operating systems) quiz,                         | Get students to identify hardware products that can be used to improve security?<br><br>Identify methods that can be used to restrict access to a computer system. | Lit<br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |

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|         | the choice and use of user interfaces.   |  | <p>presentation highlighting the features, potential uses and implications of their assigned interface.</p> <ul style="list-style-type: none"> <li>• <b>Small-group activity 2:</b> Each group to take turns present their findings to the rest of the class.</li> <li>• Windows Operating System Security Issues – CompTIA (13 minutes):</li> <li>• <a href="https://www.youtube.com/watch?v=5WHdDpXXLb0">https://www.youtube.com/watch?v=5WHdDpXXLb0</a></li> <li>• 10 things you need to do to manage your network effectively:</li> <li>• <a href="http://www.computerworld.com/article/2470688/endpoint-security/10-things-you-need-to-do-to-manage-your-network-effectively.html">http://www.computerworld.com/article/2470688/endpoint-security/10-things-you-need-to-do-to-manage-your-network-effectively.html</a></li> </ul> |   | Ext: Find some biometric products that can read user fingerprints or eye retinas  |   |
| 23 & 24 | <p><b>A2 Computer software within a computer system</b></p> <ul style="list-style-type: none"> <li>• Types of operating systems</li> <li>• The role of the kernel in controlling and managing system components and tasks</li> </ul> | <b>What is the role of the kernel in controlling and managing systems?</b> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson/learning consolidation activity.</li> <li>• <b>Tutor presentation:</b> Discuss the command verbs used and how learners should structure their answers when presented with them. Definitions are in the specification.</li> <li>• <b>Independent activity:</b> Provide learners with a series of exam-style questions on operating systems in a range of vocational contexts</li> </ul>   | <p>Exam style questions on operating systems in a range of vocational contexts</p> <p>AP Test</p> | Get students to research 'What kind of systems are used for data collection and processing? What system does your school or college use? Do you have any family or friends who work in a large organisation? What kind of system do they use? What data is input and output? How is it processed? | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|         | <ul style="list-style-type: none"> <li>• The role of the operating system in managing networking and security</li> <li>• Factors affecting the choice and use of user interfaces.</li> </ul> |   |  |   |   |   |
| 25 & 26 | <p><b>A2 Computer software within a computer system</b></p> <ul style="list-style-type: none"> <li>• Utility software</li> <li>• Application software</li> </ul>                             | <p><b>What implications of utility software and application software?</b></p> | <ul style="list-style-type: none"> <li>• <b>Tutor presentation:</b> Introduce the lesson. Discuss with learners the concept of utility and application software and the distinction between the two.</li> <li>• <b>Independent learning activity:</b> Learners to investigate the implementation of utility software and application software on different devices, e.g. how might a version of a productivity suite on a mobile device differ from one on a desktop pc?</li> <li>• <b>Small-group activity:</b> In pairs or small groups, learners should discuss and expand their notes from the research activity.</li> <li>• <b>Independent activity:</b> Learners to respond to an exam-style question relating to utility and application software.<br/>Utility Software (2 minutes):</li> </ul> | Learners to respond to an exam-style question relating to utility and application software. | <p>What benefits are there to multi-level sorting of data?<br/>What real-life examples can you find for data sorted in this way?</p> <p>Google 'multi-level sort Excel'</p> <p>Ext: Why are the different sort orders useful for the data examples you found?</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|         |   |  | <a href="https://www.youtube.com/watch?v=PAsXKddNF4">https://www.youtube.com/watch?v=PAsXKddNF4</a><br>Top 5 open-source utility software (5 minutes):<br><a href="https://www.youtube.com/watch?v=pmgxAxSiaqI">https://www.youtube.com/watch?v=pmgxAxSiaqI</a>   |   |  |  |
| 27 & 28 | <b>A2 Computer software within a computer system</b> <ul style="list-style-type: none"> <li>The principles and implications of open-source operating systems and software</li> </ul>    | <b>What are the principles of open-source software?</b>    | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the focus of the lesson – to consider sources and implications of open-source and proprietary software.</li> <li><b>Individual learning activity:</b> Learners to investigate the principles and implications of open-source software.</li> <li><b>Plenary:</b> Learners respond to a series of short response exam-style questions about open-source software.</li> </ul>   | Short response exam style questions   | Why do you think the Met Office needs so many parallel processors? Why would an ultra-quick single processor not be appropriate for this computer system?<br><br>Find out how many input sensors from weather stations this system uses. | Lit<br>Social<br>So8<br>C3<br>Sp2<br>Sp5 |
| 29 & 30 | <b>A3 Data processing</b> <ul style="list-style-type: none"> <li>The use, features and implications of computer systems for data processing</li> <li>The role of hardware in</li> </ul> | <b>How important is data processing within a computer?</b> | <ul style="list-style-type: none"> <li><b>Tutor presentation:</b> Introduce the lesson and explain the importance of data processing within a computer system and its role in fulfilling key tasks and functions in a range of sectors.</li> <li><b>Independent learning activity:</b> Learners to conduct research into the software, devices and peripherals that are used to aid manual and automatic data processing (i.e. devices that capture, process and output data into systems)</li> </ul> | Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question | A2 Computer Software in a Computer System & A3 Data Processing Booklets  | Lit<br>Social<br>So8<br>C3<br>Sp2<br>Sp5 |

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|         | <p>collecting data</p> <ul style="list-style-type: none"> <li>• The role of software in collecting data</li> <li>• Data processing functions</li> </ul> |   | <ul style="list-style-type: none"> <li>• <b>Small-group discussion:</b> In pairs or small groups, learners to discuss their findings and share ideas, particularly in relation to the concepts introduced in the independent learning activity.</li> <li>• <b>Independent learning:</b> Set learners the challenge of identifying an example of emerging/novel/interesting use of data processing (e.g. RFID, QR codes)</li> <li>• Show learners the YouTube clips on computer and data processing and big data. The first clip is about 10 years old – learners should compare this with the second clip about big data and the challenges of processing this.</li> <li>• Computer and data processing (2 minutes):<br/><a href="https://www.youtube.com/watch?v=37hGMVvLw8w">https://www.youtube.com/watch?v=37hGMVvLw8w</a></li> <li>• Explaining big data (8.5 minutes):<br/><a href="https://www.youtube.com/watch?v=7D1CQ_LOizA">https://www.youtube.com/watch?v=7D1CQ_LOizA</a></li> </ul> |   |   |   |
| 31 & 32 | <p><b>A3 Data processing</b></p> <ul style="list-style-type: none"> <li>• The use, features and implications of computer systems</li> </ul>             | <p><b>How important is data processing within a computer?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Learners to share their findings from the independent activity from the previous lesson.</li> <li>• <b>Small-group activity:</b> Sort learners into groups of 3. Provide each group with a different vocational scenario (e.g. a company/individual and the aims of their vocational context). (Contexts provided earlier in this unit can be</li> </ul>   | <p>Explanation of how data processing devices can aid a person achieving their aim – each outcome will be different depending on the given scenario</p> | <p><b>Learning aim A hardware &amp; software:</b><br/>Data processing – revision exercise</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|         | <p>for data processing</p> <ul style="list-style-type: none"> <li>• The role of hardware in collecting data</li> <li>• The role of software in collecting data</li> <li>• Data processing functions</li> </ul>  |  | <p>revisited). As a group, learners should identify how specific manual and automatic data processing devices/systems would aid them in achieving their aims.</p> <ul style="list-style-type: none"> <li>• <b>Class discussion:</b> Each group to present a summary of their scenario and solution to the rest of the class.</li> </ul>  |   |  |  |
| 33 & 34 | <p><b>A3 Data processing</b></p> <ul style="list-style-type: none"> <li>• The use, features and implications of computer systems for data processing</li> <li>• The role of hardware in collecting data</li> <li>• The role of software in collecting data</li> </ul> | <p><b>What is the role of software in data processing?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the focus of the lesson – explore data processing functions.</li> <li>• <b>Independent learning activity:</b> Learners to conduct research into specific tasks carried out for each of the listed data processing functions.</li> <li>• <b>Group activity:</b> In small groups, learners should discuss each other's findings and expand their notes accordingly</li> </ul> | <p>Explanation of the role of different software used in data collection – each group of students' answers will be dependent on the scenario given.</p> | <p>Students to research and write about the benefits to businesses of synchronising data between mobile devices and an office computer network</p> | <p>Lit<br/>Social<br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|         | <ul style="list-style-type: none"> <li>Data processing functions</li> </ul>  |   |  |  |  |   |
| 35 & 36 | <p><b>A3 Data processing</b></p> <p>The impact on individuals and organisations of using and storing data across multiple computer systems</p> | <p><b>What are the uses and implications of local and remote storage?</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Through Q&amp;A establish learners' base line understanding of 'cloud and 'remote' storage. It is likely that knowledge and examples will relate to personal rather than professional use.</li> <li><b>Group activity:</b> In groups, learners to discuss and conduct research on the uses and implications of local and remote storage. Direct learners to make distinctions between personal and professional uses of the associated technologies.<br/><br/>Show learners the YouTube clips that give different perspectives of local, remote and cloud storage from the viewpoint of users.</li> <li><b>Class discussion:</b> As a class, discuss findings and share ideas<br/><br/>Local vs remote storage (5.5 minutes):<br/><a href="https://www.youtube.com/watch?v=9kSZ0RkwRq8">https://www.youtube.com/watch?v=9kSZ0RkwRq8</a><br/><br/>Local storage vs cloud storage (3.5 minutes):<br/><a href="https://www.youtube.com/watch?v=0EQhZIBYzJA">https://www.youtube.com/watch?v=0EQhZIBYzJA</a><br/><br/>Cloud storage types (6.5 minutes):<br/><a href="https://www.youtube.com/watch?v=CczKEbEIR9U">https://www.youtube.com/watch?v=CczKEbEIR9U</a></li> </ul> | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question</p> | <p>Why would a hacker want to delete or corrupt data in a computer system?</p> <p>What reasons would there be to damage an organisation?</p> <p>Ext: What organisations do you think would be targets for such an attack? Why?</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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| 37 & 38 | <b>A3 Data processing</b><br>Backup and data recovery procedures  | <b>What different backup and recovery procedures are there?</b> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the purpose of the lesson giving learners an overview of areas they will focus on (e.g. full back up and incremental).</li> <li>• <b>Individual learning activity 1:</b> Learners to research and make notes on different backup and recovery procedures (including associated hardware, software) and the implications of these procedures.</li> <li>• <b>Individual learning activity 2:</b> Provide learners with a number of vocational scenarios for which they should analyse backup and recovery procedures and how they would meet the needs of the scenarios.</li> </ul>   | A clear analysis of backup and recovery procedures – students’ responses will be dependent on the scenario given. | BTEC Revision book page 63-4  | Lit<br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |
| 39 & 40 | <b>A3 Data processing</b> <ul style="list-style-type: none"> <li>• Flow charts and system diagrams</li> </ul> | <b>Can you interpret these flow charts and system diagrams?</b> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson by providing examples of flow charts and system diagrams for learners to interpret and describe what they represent.</li> <li>• <b>Individual activity:</b> Provide learners with a series of diagrams and flow charts that represent systems. Learners should identify the similarities and differences between the diagrams and make notes relating to key features of system diagrams and flow charts.</li> <li>• All about flow charts:<br/> <a href="http://www.education.rec.ri.cmu.edu/robots/4H/roboticsandyouonline/probe_content/probe_12/flowcharts.pdf">http://www.education.rec.ri.cmu.edu/robots/4H/roboticsandyouonline/probe_content/probe_12/flowcharts.pdf</a> </li> </ul> | An informal quiz on flow charts and system diagrams.  | Learners redraft/improve their response based on their discussions. | Lit<br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |

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|         |   |   | <ul style="list-style-type: none"> <li>• A range of flow chart examples that represent processes:<br/><a href="https://www.smartdraw.com/flowchart/examples/">https://www.smartdraw.com/flowchart/examples/</a></li> <li>• <b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the discussion to form a resource that can be given to learners.</li> <li>• <b>Group activity:</b> Provide learners with a series of scenarios/tasks that require them to interpret a diagram or require them to explain/represent a given system in diagrammatical form. NB: At this stage, learners' diagrams should focus on the data/information that is exchanged between components of a system and not on the type of connection used.</li> <li>• <b>Class discussion:</b> Learners to discuss their ideas and share their solutions.</li> </ul> |   |  |   |
| 41 & 42 | <p><b>B1 Approaches to computer architecture</b></p> <p>The features and characteristics of different computer architecture models – stored</p> | <p>What are the characteristics, applications and implications of stored program architecture model (including Von Neumann and Harvard)</p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson by providing an overview of the stored program model.</li> <li>• <b>Individual activity:</b> Learners conduct individual research on the characteristics, applications and implications of stored program architecture model (including Von Neumann and Harvard)</li> <li>• Von Neumann vs. Harvard (2.5 minutes):</li> </ul>  | <p>An informal quiz on the key concepts of the architecture model</p> | <p>Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision.</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    | <p>program model</p> <p><b>F2 Flow charts and system diagrams</b></p>   |   | <ul style="list-style-type: none"> <li><a href="https://www.youtube.com/watch?v=EjQQde8FMEY">https://www.youtube.com/watch?v=EjQQde8FMEY</a></li> <li>Intro to computer architecture: <a href="https://www.youtube.com/watch?v=HEjPop-aK_w">https://www.youtube.com/watch?v=HEjPop-aK_w</a></li> <li><b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the discussion to form a resource that can be given to learners.</li> </ul>  |                                       |   |   |
| 43 | <p><b>B1 Approaches to computer architecture</b></p> <ul style="list-style-type: none"> <li>Cluster computing</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p> | <b>What is cluster computing?</b>   | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson by providing an overview of cluster computing.</li> <li><b>Individual activity:</b> Learners conduct individual research on the characteristics, applications and implications of cluster computing.</li> <li>What is cluster computing? <a href="http://www.wisegeek.org/what-is-cluster-computing.htm">http://www.wisegeek.org/what-is-cluster-computing.htm</a></li> <li><b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the discussion to form a resource that can be given to learners.</li> <li><b>Knowledge quiz:</b> An informal quiz on the key concepts.</li> </ul> | An informal quiz on the key concepts. | Learners to use what they have learnt in lesson to produce a handout on the characteristics, applications and implications of cluster computing | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |
| 44 | <p><b>B1 Approaches to computer architecture</b></p> <ul style="list-style-type: none"> <li>Uniform memory access and non-</li> </ul>                                     | <b>What are the characteristics, applications and implications of UMA and NUMA?</b> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson by providing an overview of uniform and non-uniform memory access (UMA and NUMA).</li> <li><b>Individual activity:</b> Learners conduct individual research on the</li> </ul>   | Exam style questions on UMA and NUMA  | Produce an information sheet or PowerPoint on the characteristics, applications and implications of UMA and NUMA.                               | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    | uniform memory access<br><b>F2 Flow charts and system diagrams</b>                |  | <p>characteristics, applications and implications of UMA and NUMA.</p> <ul style="list-style-type: none"> <li>• NUMA and UMA and shared memory multiprocessor computer science essay:<br/><a href="https://www.ukessays.com/essays/computer-science/numa-and-uma-and-shared-memory-multiprocessors-computer-science-essay.php">https://www.ukessays.com/essays/computer-science/numa-and-uma-and-shared-memory-multiprocessors-computer-science-essay.php</a></li> <li>• <b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the discussion to form a resource that can be given to learners.</li> </ul> |   |   |  |
| 45 | <b>B1 Approaches to computer architecture</b><br>Use and application of emulation | <b>What are the uses, applications and associated implications of emulation in computer systems?</b> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson by providing an overview of emulation.</li> <li>• <b>Small-group activity:</b> In pairs or groups of three, learners conduct research into the uses, applications and associated implications of emulation in computer systems.</li> <li>• An overview of video game emulation:<br/><a href="http://gamerant.com/video-game-emulation-emu-hobby-johnc-4098/">http://gamerant.com/video-game-emulation-emu-hobby-johnc-4098/</a></li> <li>• <b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the discussion.</li> </ul>  | Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question | Learner to produce an information sheet on the uses, applications and associated implications of emulation in computer systems. | Lit<br>Social<br>So8<br>C3<br>Sp2<br>Sp5 |
| 46 | <b>B1 Approaches to computer architecture</b>                                     | <b>Analyse how different architecture models could be used to meet the</b>                           | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Use a Q&amp;A session to check understanding of computer architecture. Introduce the task</li> </ul>  | Exam style questions on emulation   | PG Online exercises pg 125-130  | Lit<br>Social<br>So8                     |

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|    | <ul style="list-style-type: none"> <li>Factors affecting the choice of different architecture models</li> </ul> <p>The impact of using different architecture models</p>             | <p><b>needs of a given organisation and the potential factors that they would need to consider.</b></p> | <p>that they will be focusing on this lesson.</p> <ul style="list-style-type: none"> <li><b>Individual activity:</b> Provide learners with vocational scenarios that require them to analyse how different architecture models could be used to meet the needs of a given organisation and the potential factors that they would need to consider.</li> </ul>  |   |  | <p>C3<br/>Sp2<br/>Sp5</p>                            |
| 47 | <p><b>B2 The concepts of micro architecture</b></p> <ul style="list-style-type: none"> <li>Instruction cycles</li> <li>Execution speeds</li> <li>Cache</li> <li>Registers</li> </ul> | <p><b>Analyse how different architecture models can be used to meet individual needs</b></p>            | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson.</li> <li><b>Tutor presentation:</b> Provide an overview of the purpose of CPU and GPU technology, the component and related parts of the CPU's architecture (ALU, cache, registers etc.) and the concept of instruction cycles and execution speeds.</li> <li>The microarchitecture of Intel, AMD and VIA CPUs:<br/><a href="http://www.agner.org/optimize/microarchitecture.pdf">http://www.agner.org/optimize/microarchitecture.pdf</a></li> <li><b>Paired activity:</b> Learners work through a series of scenarios which focus on CPU and related hardware specifications and how these and external factors may affect the given scenario. Learners should consider all areas covered in topic B2.2.</li> <li><b>Small-group activity:</b> Each pair should join with another to form a group of four. Within the group, learners should discuss and develop their responses.</li> </ul> | <p>Completion of the analysis of how different architecture models can be used to meet individual needs</p> | <p>Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision.</p> | <p>Lit<br/>Social<br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|    |   |  | Learners may benefit from access to the document entitled 'The microarchitecture of Intel, AMD and VIA CPUs', which is a guide to microarchitecture, updated in January 2016. It is a 218 page document that may challenge some learners. Even so, it provides a good reference guide.   |  |  |   |
| 48 | <p><b>B2 The concepts of micro architecture</b></p> <p>The use and choice of instruction sets</p> | <p><b>What are the characteristics, applications and implications of different instructions sets (e.g. reduced and complex sets)</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson by providing an overview of the use of instruction sets used by computers</li> <li>• <b>Individual activity:</b> Learners conduct individual research on the characteristics, applications and implications of different instructions sets (e.g. reduced and complex sets)</li> </ul> <p>Learners may benefit from access to the document mentioned in the previous lesson, The microarchitecture of Intel, AMD and VIA CPUs.</p> <ul style="list-style-type: none"> <li>• The microarchitecture of Intel, AMD and VIA CPUs:<br/><a href="http://www.agner.org/optimize/microarchitecture.pdf">http://www.agner.org/optimize/microarchitecture.pdf</a></li> </ul> <p><b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the discussion to form a resource that can be given to learners</p> <ul style="list-style-type: none"> <li>• <b>Plenary:</b> Learners respond to a number of short response exam-style questions</li> </ul> | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question</p> | <p>Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision.</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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| 49 | <p><b>B2 The concepts of micro architecture</b></p> <ul style="list-style-type: none"> <li>Pipelining</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p>                           | <p><b>What is pipelining?</b></p>   | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson by providing an overview of the concept of pipelining.</li> <li><b>Individual activity:</b> Using independent research, learners produce a written report on the concept of pipelining for CPU and GPU instructions and how this and related processes affect the performance of a system.</li> <li>Pipelining:<br/> <a href="http://whatis.techtarget.com/definition/pipelining">http://whatis.techtarget.com/definition/pipelining</a><br/> <a href="http://www.webopedia.com/TERM/P/pipelining.html">http://www.webopedia.com/TERM/P/pipelining.html</a><br/> <a href="http://techterms.com/definition/pipeline">http://techterms.com/definition/pipeline</a> </li> </ul> <p><b>Knowledge quiz:</b> An informal quiz on the key concepts.</p> | <p>An informal quiz on the key concepts.</p> | <p>Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision.</p>   | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |
| 50 | <p><b>B2 The concepts of micro architecture</b></p> <ul style="list-style-type: none"> <li>Multi-processing and multi-threading</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p> | <p><b>What are the features, uses and implications of multi-processing and multi-threading?</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson by providing an overview of the concept of multi-processing and multi-threading.</li> <li><b>Individual activity:</b> Using independent research, learners make notes on the features, uses and implications of multi-processing and multi-threading. Ensure that learners understand the difference between multi-threading and multi-processing.</li> <li><b>Class discussion:</b> As a class, discuss learners' observations. Record the key points of the</li> </ul>   | <p>Short response exam-style questions.</p>  | <p>Pipelining is a powerful technology that is built into modern processor CPU chips to help them run code more effectively. What is pipelining? How does it improve performance? What are the potential problems that need to be overcome in the design of pipelining inside these chips?</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|    |  |  | <p>discussion to form a resource that can be given to learners</p> <ul style="list-style-type: none"> <li>• <b>Plenary:</b> Learners respond to a number of short response exam-style questions.</li> <li>• Pipelining: <ul style="list-style-type: none"> <li><a href="http://whatis.techtarget.com/definition/pipelining">http://whatis.techtarget.com/definition/pipelining</a></li> <li><a href="http://www.webopedia.com/TERM/P/pipelining.html">http://www.webopedia.com/TERM/P/pipelining.html</a></li> <li><a href="http://techterms.com/definition/pipeline">http://techterms.com/definition/pipeline</a></li> </ul> </li> <li>• The difference between multi-threading and multi-processing: <ul style="list-style-type: none"> <li><a href="http://erpbasic.blogspot.co.uk/2012/03/difference-between-multithreading-and.html">http://erpbasic.blogspot.co.uk/2012/03/difference-between-multithreading-and.html</a></li> </ul> </li> </ul> |  | <p>Use the internet to research how pipelining works.</p> <p>Ext: Visit the Intel website to read their promotional materials for the current range of processors. What has Intel done to design their best use of pipelining?</p>   |   |
| 51 | <p><b>B2 The concepts of micro architecture</b></p> <ul style="list-style-type: none"> <li>• The features and implications of embedded and mobile CPU architecture</li> <li>• The features and implications</li> </ul> | <p><b>What are the features, uses and implications of CPU architecture in embedded, mobile, and desktop and server technologies?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson and use Q&amp;A to recap key points covered so far regarding computer architecture.</li> <li>• <b>Individual activity 1:</b> Using independent research, learners make notes on the features, uses and implications of CPU architecture in embedded, mobile, and desktop and server technologies.</li> <li>• <b>Small-group activity:</b> Provide each group with a series of computing tasks that they must perform using different technologies (embedded, mobile, desktop etc.) learners should keep a log of and analyse the</li> </ul>  | <p>Learners respond to exam-style questions about the features and implications of different CPU architecture implementations.</p> | <p>Many businesses use a server computer that is an enhanced version of a desktop PC. How is this different from a normal desktop PC? What features are likely to be present in a server computer?</p> <p>Brainstorm as many features that you can think of that would be useful in a server computer, for</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    | <p>s of microcomputer architecture</p> <ul style="list-style-type: none"> <li>The features and implications of server architecture</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p>  |  | <p>performance differences between the different technologies when performing the same task.</p> <ul style="list-style-type: none"> <li><b>Class activity:</b> Discuss learners' research and findings from the practical task.</li> <li><b>Individual activity 2:</b> Learners respond to exam-style questions about the features and implications of different CPU architecture implementations.</li> </ul>   |  | <p>example lots of disc space.</p> <p>Ext: Visit the Dell UK website to research the features that they build into their more expensive servers. How does this list compare with your brainstormed list?</p>   |   |
| 52 | <p><b>B2 Concepts of microarchitecture</b></p> <ul style="list-style-type: none"> <li>Registers</li> </ul> <p><b>B3 Registers and register handling</b></p> <ul style="list-style-type: none"> <li>Types of register</li> <li>The function of general and special registers and their impact on the way computer</li> </ul> | <p><b>What is the function and purpose of general and special registers?</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson providing an overview of registers.</li> <li><b>Individual activity 1:</b> Using independent research, learners make notes on the role general purpose and special registers perform in a computer system.</li> <li><b>Individual activity 2:</b> Learners respond to a series of exam-style questions about registers and register handling</li> <li><b>Small-group activity:</b> Provide each group with mark schemes for the exam-style questions. Learners to discuss their answers in relation to the provided mark schemes.</li> </ul> <p>Registers, flip-flops and modular design (4 minutes):</p> | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question</p> | <p>Assessment Practice – You have a part-time job in a small computer advisor. The owner has asked for some materials that the shop can use to help explain to customer how processors work.</p> <p>Produce a booklet which describes how the fetch-execute cycle works in a CPU.</p> <p>Include the special registers involved in these operations along with their</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|         | <p>systems perform</p> <ul style="list-style-type: none"> <li>• The role of interrupts within a computer system</li> <li>• Interrupts</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p>   |  | <p><a href="https://www.youtube.com/watch?v=OfxYoQn7uJ4">https://www.youtube.com/watch?v=OfxYoQn7uJ4</a></p>   |   | <p>roles in the fetch-execute cycle</p>  |   |
| 53 & 54 | <p><b>C1 Number systems</b></p> <ul style="list-style-type: none"> <li>• The use and interpretation of number systems used within computer systems</li> <li>• The use of binary arithmetic to perform calculations</li> <li>• The use of binary to represent negative and floating</li> </ul> | <p><b>What are the concepts of units used to express data and how binary and BCD are used to represent numerical values?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the concept of representing data/information in a form that can be processed by the computer (e.g. binary data).</li> <li>• <b>Tutor presentation:</b> Explore the concepts of units used to express data and how binary and BCD are used to represent numerical values. Introduce the concept of performing arithmetic using binary and BCD.</li> <li>• Cisco binary game: <a href="http://forums.cisco.com/CertCom/game/binary_game_page.htm">http://forums.cisco.com/CertCom/game/binary_game_page.htm</a></li> <li>• Binary math: <a href="http://www.binarymath.info/practice-exercises.php">http://www.binarymath.info/practice-exercises.php</a></li> <li>• <b>Individual activities:</b> Learners to respond to a series of tasks/questions requiring them to perform calculations and</li> </ul> | <p>Responses from a series of tasks/questions requiring them to perform calculations and mathematical processes using binary and BCD.</p> | <p>Binary is a numbering system with only two valid digits, 0 and 1. Any collection of binary digits can be converted into a denary or hexadecimal number by including column headings and then adding together every column heading with a 1 under it. What is a base number? Why do column headings work for numbering systems?</p> <p>Research the BBC Bitesize website on binary addition to</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    | <p>point numbers</p> <p><b>F1 The use of logic and data flow within computer systems</b></p> <p>Boolean logic</p>   |   | <p>mathematical processes using binary and BCD.</p> <ul style="list-style-type: none"> <li>• <b>Plenary:</b> Use individual, group and whole class activities to explore responses and identify areas for improvement.</li> </ul>   |   | <p>check that you are able to add two binary numbers. Translate the numbers into denary (base 10) to check your answers.</p> <p>Ext: What would be the column headings for a base 8 numbering system? Convert two numbers into base 8 and then add them together. Translate your answer back to base 10 to check that it is correct.</p> |   |
| 55 | <p><b>C2 Text representation</b></p> <ul style="list-style-type: none"> <li>• The purpose and implications of using codes to represent character sets</li> <li>• The features and uses of common</li> </ul> | <p>What is the purpose, features and implications of common character sets (including ASCII and UNICODE)?</p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson by providing an overview of the concept of character sets and how they relate to binary number systems.</li> <li>• <b>Individual activity:</b> Learners conduct individual research into the purpose, features and implications of common character sets (including ASCII and UNICODE).</li> <li>• Standards: ASCII vs UNICODE:<br/><a href="https://www.youtube.com/watch?v=61Bs7-ycl64">https://www.youtube.com/watch?v=61Bs7-ycl64</a></li> <li>• <b>Knowledge quiz:</b> An informal quiz on the key concepts covered so far.</li> </ul> | <p>An informal quiz on the key concepts covered so far.</p> | <p>Masking is used to convert an alphabetic character between upper and lower case using AND and OR operations between the character code and the mask. Discuss the mask and logic operations needed to convert a character to upper case or to lower case</p>   | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    | character sets   |   |   |  |                             |   |
| 56 | <p><b>C3 Image representation</b></p> <ul style="list-style-type: none"> <li>How bitmap/raster image data is stored and represented within a computer system</li> <li>The impact of image resolution on the way images are stored and represented</li> <li>The impact of sample /bit depth on the way the image data is stored and images are displayed</li> </ul> <p>The effects of compression on image data</p> | <p><b>How are graphics and images stored in a computer?</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson by providing an overview of the concept of the relationship between the binary data, numerical values and the image data that is stored by the computer system.</li> <li><b>Individual learning activity:</b> Using individual research learners produce a written report covering topics C3.1, C3.2 and C3.3.</li> <li>How are graphics and images stored in a computer?<br/><a href="http://www.ehow.com/about_6625295_graphics-images-stored-computer_.html">http://www.ehow.com/about_6625295_graphics-images-stored-computer_.html</a></li> </ul> <p><b>Plenary:</b> Learners respond to exam-style questions on image representation.</p> | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question</p> | <p>PG Online pg 70 - 74</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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| <p>57</p> | <p><b>C3 Image representation</b></p> <ul style="list-style-type: none"> <li>• How bitmap/raster image data is stored and represented within a computer system</li> <li>• The impact of image resolution on the way images are stored and represented</li> <li>• The impact of sample /bit depth on the way the image data is stored and images are displayed</li> </ul> <p>The effects of compression on image data</p> | <p><b>What are the concepts of file image types and formats with reference to resolution, bit depth and compression formats?</b></p> | <ul style="list-style-type: none"> <li>• <b>Tutor presentation:</b> Introduce the lesson. Provide learners with an overview of the concepts of file image types and formats with reference to resolution, bit depth and compression formats.</li> <li>• <b>Paired activity:</b> Provide each pair with access to a range of different image file formats (e.g. vector formats, bitmap images, common application formats and compressed files) Provide learners with a series of scenarios and get them to explore the properties etc. of each of the files to find out how the file format and type would affect the given scenarios.</li> <li>• Common image file formats: <a href="http://socialcompare.com/en/comparison/image-file-formats">http://socialcompare.com/en/comparison/image-file-formats</a></li> <li>• <b>Class discussion:</b> Learners to discuss the outcomes of the file format task e.g. how quality was affected by bit depth.</li> </ul> | <p>Clear explanation of the outcomes of the file format task e.g. how quality was affected by bit depth</p> | <p>Students to complete assessment task – You have been asked to prepare a presentation that can be used as a rolling display for a trade stand at a business fair to help promote a new range of storage devices.</p> <p>The presentation is to be divided into three sections, each with an introduction slide followed by slides detailing the technical content.</p> <p>Section 1: Binary representation of data<br/>Explain how binary bits can be combined together into bytes, megabytes, gigabytes and terabytes with examples of where each could be found inside a computer system.</p> | <p>Lit</p> <p>Social</p> <p>So8<br/>C3<br/>Sp2<br/>Sp5</p> |
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|    |  |  |   |  | <p>Section 2: Text representation of data</p> <p>Explain how ASCII and UNICODE are used.</p> <p>Section 3: Image representation</p> <p>Explain how the quality of a digital image can have an impact upon the storage size</p> |   |
| 58 | <p><b>D1 Data structures</b></p> <ul style="list-style-type: none"> <li>The features, applications and implications of data types used within computer systems <ul style="list-style-type: none"> <li>array</li> <li>list</li> </ul> </li> <li>The use and application of data types within</li> </ul> | <p>What are the characteristics of the two data structures, including how they hold data and how the data is assigned to computer memory</p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Provide a brief introduction to the concepts of data structures.</li> <li><b>Independent learning activity 1:</b> Learners to do independent research into 'lists' and 'arrays'. They should research the characteristics of the two data structures, including how they hold data and how the data is assigned to computer memory.</li> <li>Data structures: <a href="http://www.slideshare.net/NavtarSiddhuBrar/data-structure-and-its-types-7577762">http://www.slideshare.net/NavtarSiddhuBrar/data-structure-and-its-types-7577762</a></li> <li>Lists(arrays): <a href="http://cscircles.cemc.uwaterloo.ca/13-lists/">http://cscircles.cemc.uwaterloo.ca/13-lists/</a></li> <li>List of data structures:</li> </ul> | <p>Informal quiz to check learners' understanding of lists and arrays.</p> | <p>Give learners a series of vocational scenarios and associated data. Learners should discuss the use and implications of lists and arrays in the given scenario</p>  | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    | <p>computer software</p> <ul style="list-style-type: none"> <li>The use and implications of data types within computer hardware</li> </ul> <p><b>F1 The use of logic and data flow within computer systems</b></p> <p>Boolean logic</p>                                |  | <p><a href="https://en.wikipedia.org/wiki/List_of_data_structures">https://en.wikipedia.org/wiki/List_of_data_structures</a></p> <ul style="list-style-type: none"> <li>Data structures - basic concepts: <a href="http://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics.htm">http://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics.htm</a></li> <li>Explain different types of data structures: <a href="http://www.onlineclassnotes.com/2015/03/explain-different-types-of-data.html">http://www.onlineclassnotes.com/2015/03/explain-different-types-of-data.html</a></li> <li><b>Class discussion:</b> Use Q&amp;A to check learners' understanding of lists and arrays.</li> </ul> |   |  |   |
| 59 | <p><b>D1 Data structures</b></p> <ul style="list-style-type: none"> <li>The features, applications and implications of data types used within computer systems <ul style="list-style-type: none"> <li>stack</li> <li>queue</li> </ul> </li> <li>The use and</li> </ul> | <p>What are the concept of stacks and queues providing examples of how the data is stored and retrieved in a computer memory</p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Recap understanding of arrays and lists. Introduce the concept of stacks and queues.</li> <li><b>Tutor presentation:</b> Explore the concept of stacks and queues providing examples of how the data is stored and retrieved in a computer memory.</li> <li><b>Independent learning activity 1:</b> Learners make notes on the characteristics of stacks and queues and their uses. Learners do additional research as required.</li> <li>Data structures - basic concepts: <a href="http://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics.htm">http://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics.htm</a></li> </ul>         | <p>Activity task on pg 106 of the BTEC Book – Draw a shape with 5 corners on graph paper using straight lines. Write (x, y) coordinates onto paper the use matrix calculations to multiply these by the 2x2 matrix shown in Fig 2.12 to calculate the new (x, y) coordinates for your shape</p> | <p>Learners to work through a series of problems involving stacks and queues, such as describing how data is processed, identifying particular advantages/disadvantages.</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|  | <p>application of data types within computer software</p> <ul style="list-style-type: none"> <li>The use and implications of data types within computer hardware</li> </ul> <p><b>F1 The use of logic and data flow within computer systems</b></p> <ul style="list-style-type: none"> <li>Boolean logic</li> </ul> |  | <ul style="list-style-type: none"> <li>Explain different types of data structures: <ul style="list-style-type: none"> <li><a href="http://www.onlineclassnotes.com/2015/03/explain-different-types-of-data.html">http://www.onlineclassnotes.com/2015/03/explain-different-types-of-data.html</a></li> </ul> </li> <li>What is a stack data structure – an introduction to stacks (6 minutes): <ul style="list-style-type: none"> <li><a href="https://www.youtube.com/watch?v=FNZ5o9S9prU">https://www.youtube.com/watch?v=FNZ5o9S9prU</a></li> </ul> </li> </ul> | <p>rotated by 180 degrees.</p> <p>Plot your new (x, y) coordinates onto graph paper to check your calculations</p> <p>Use Excel to repeat this exercise. Notice how the first (x, y) coordinates are repeated in the last column of the spreadsheet so Excel draws the last line in your chart. You can select the cells where you want the new XY coordinates then use the MMULT() array formula to calculate them. The first array in your MMULT() formula is the 2x2 matrix, the second give your (x, y) coordinates. The MMULT() formula completes with Ctrl+Shift+Enter</p> |  |  |
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| 60 - 61 | <p><b>D1 Data structures</b></p> <ul style="list-style-type: none"> <li>The use and application of data types within computer software</li> </ul> <p><b>A2 Computer software within a computer system</b></p> <ul style="list-style-type: none"> <li>Application software</li> </ul> <p><b>A3 Data processing</b></p> <p><b>F1 The use of logic and data flow within computer systems</b></p> <p>Boolean logic</p> | What are the concepts of databases as a structure to hold data?         | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the concept of use of databases as a structure to hold data.</li> <li><b>Individual learning activities:</b> Learners complete a series of practical tasks using a database to: <ul style="list-style-type: none"> <li>set up tables and data types</li> <li>edit and populate data tables</li> <li>sort and extract data</li> <li>model 'what if' scenarios</li> <li>presenting data and results.</li> </ul> </li> <li><b>Class discussions:</b> Use whole class and small-group discussion to explore how the data types are used and the impact they have on the quality and usability of the system (e.g. discuss why data may be stored as a particular data type).</li> </ul> | Completed tables set up with tasks carried out consisting of 'what if' scenarios completed – data presented with clear results | Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision. Plus completion of BTEC Revision Book page 76 - 77 | Lit<br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |
| 62 - 66 | <p><b>D1 Data structures</b></p> <ul style="list-style-type: none"> <li>The features, applications and</li> </ul>  | How arrays, lists and data types are used within a programming context. | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Use Q&amp;A and knowledge quizzes to recap understanding of arrays, lists and data types.</li> <li><b>Tutor presentation:</b> Explore how arrays, lists and data types are used within a programming</li> </ul>   | Deep Assessment in Purple books on topics learnt over the last couple of weeks –   | Assessment task – You are a member of a team that has been selected to produce two training sessions   | Lit<br>Social<br><br>So8<br>C3               |

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|  | <p>implications of data types used within computer systems</p> <ul style="list-style-type: none"> <li>○ array</li> <li>○ list</li> </ul> <ul style="list-style-type: none"> <li>• The use and application of data types within computer software</li> </ul> <p><b>F1 The use of logic and data flow within computer systems</b></p> <p>Boolean logic</p> |  | <p>context. Provide examples using simple snippets of code.</p> <ul style="list-style-type: none"> <li>• <b>Learning Activities:</b> In pairs or individually, provide learners with code that they can experiment with. Tasks they could perform include: <ul style="list-style-type: none"> <li>○ changing data types to see the effect it has on the program or final outcome</li> <li>○ entering test data into a program to see how entering different data affects the outcome</li> <li>○ adding, removing, calling etc. items from arrays and lists.</li> </ul> </li> </ul> <p>Linked lists (13 minutes):<br/> <a href="https://www.youtube.com/watch?v=pBrz9HmjFOs">https://www.youtube.com/watch?v=pBrz9HmjFOs</a></p> <p>Arrays and array lists (9 minutes):<br/> <a href="https://www.youtube.com/watch?v=Zj_UC7c1nh4">https://www.youtube.com/watch?v=Zj_UC7c1nh4</a></p> <p>NB: Learners do not have to write fully functioning programming code for this unit, but an understanding of how data is handled in such a context may be required and provides an opportunity for learners to gain a deeper understanding of the concepts.</p> | <p>with exam style question</p> | <p>for students in their first year of programming at local centres.</p> <p>The first session is to describe and explain four of the data structures commonly found in computer systems with an example of how each of the following could be used:</p> <ul style="list-style-type: none"> <li>• Stacks</li> <li>• Queues</li> <li>• Array</li> </ul> <p>The second session is to describe and explain how matrices can be used in computer systems to solve problems and to manipulate graphics</p> <p>Produce a set of handouts which:</p> <ul style="list-style-type: none"> <li>• Demonstrate how to solve simultaneous equations using matrices for a real-world problem</li> </ul> | <p>Sp2<br/>Sp5</p> |
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|         |   |   |   |   | <ul style="list-style-type: none"> <li>Use a spreadsheet model to demonstrate how shapes can be manipulated</li> </ul> |   |
| 67 - 69 | <p><b>D1 Data structures</b></p> <p><b>D2 Indices and matrices</b></p> <p><b>F1 The use of logic and data flow within computer systems</b></p> <p>Boolean logic</p> | <p>Understand the use of indices and matrices and how they are represented and used in a computer system.</p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the concept of the lesson – to understand the use of indices and matrices and how they are represented and used in a computer system.</li> <li><b>Tutor presentation:</b> Introduce the concept of matrices making connections to how they are presented in computer systems (i.e. use of arrays). Introduce the concept of row and column major order.</li> <li><b>Individual learning activities:</b> Learners to explore a number of problems such as: <ul style="list-style-type: none"> <li>performing mathematical operations using matrices</li> <li>describing how given data would be stored and processed</li> <li>analysing scenarios to suggest how data might be stored to meet identified needs.</li> </ul> </li> <li>Matrices: indices and elements: <a href="https://www.youtube.com/watch?v=Zj_UC7c1nh4">https://www.youtube.com/watch?v=Zj_UC7c1nh4</a></li> <li><b>Class discussion:</b> Use class and small-group discussion to consider ideas and improve solutions.</li> </ul> | <p>Ideas and solutions to problem set – each student's responses will be different depending on the problem they were set</p> | <p>BTEC Revision pg 80/1</p>   | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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| 70 | <p><b>E1 Transmitting data</b></p> <ul style="list-style-type: none"> <li>Types of communication channel</li> <li>Methods of connecting devices and transmitting data across and between computer systems</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p> | <p><b>The connections to transmit data within and between systems.</b></p>                                   | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson. Get learners to brainstorm as many connection types as they can think of, grouping them into wired and wireless connections.</li> <li><b>Class activity:</b> Take feedback on the list the learners came up with. Suggest any connections they may have missed.</li> <li><b>Tutor presentation:</b> Provide a brief definition/explanation of types of communication channel (e.g. simplex and duplex).<br/><a href="http://ww2.it.nuigalway.ie/staff/pbioi/ct101/CT101_IntroductionToDataCommunicationsAndNetworking.ppt">http://ww2.it.nuigalway.ie/staff/pbioi/ct101/CT101_IntroductionToDataCommunicationsAndNetworking.ppt</a></li> <li><b>Class discussion:</b> Discuss the learners' outcomes, challenging any misconceptions and technical inaccuracies.</li> <li><b>Plenary:</b> Provide scenarios that require use of connections to transmit data within and between systems. Learners to describe the process of transmitting/transferring data with particular reference to the different connection methods that could be used at each stage.</li> </ul> | <p>Learners to describe the process of transmitting/transferring data with particular reference to the different connection methods that could be used at each stage.</p> | <p>learners to create an information sheet regarding each of the connection types, including features such as uses, benefits and limitations.</p> | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |
| 71 | <p><b>E1 Transmitting data</b></p> <ul style="list-style-type: none"> <li>Types of communication channel</li> </ul>   | <p><b>The concept of how using different connection types affect the performance of a larger system.</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson. Use Q&amp;A to check learners understanding from last lesson.</li> <li><b>Class discussion:</b> Explore the concept of how using different connection types affect the performance of a larger system.</li> </ul>  | <p>Learners need to respond to vocational scenarios that would require the connection of multiple devices</p>   | <p>Learners to produce an information sheet on the different connection types and how they can affect the</p>                                     | <p>Lit<br/>Social<br/><br/>So8<br/>C3<br/>Sp2</p>         |

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|    | <ul style="list-style-type: none"> <li>• Methods of connecting devices and transmitting data across and between computer systems</li> <li>• The selection of connection methods to fulfil specific tasks and functions</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p> |  | <ul style="list-style-type: none"> <li>• <b>Individual activity:</b> Provide learners with a vocational scenario that would require the connection of multiple devices and/or systems to meet a range of aims. Learners should: <ul style="list-style-type: none"> <li>○ create a diagram showing how the systems will connect</li> <li>○ annotate the diagram to explain the connections used, the data being transferred and the direction of data transfer.</li> </ul> </li> </ul> <p>Network connector types - CompTIA (10 minutes):<br/> <a href="https://www.youtube.com/watch?v=dvKTAGDImpI">https://www.youtube.com/watch?v=dvKTAGDImpI</a></p> | and/or systems to meet a range of aims. They should justify choices of connections used in comparison to other possible connections. | performance of a larger system  | Sp5                                      |
| 72 | <p><b>E1 Transmitting data</b></p> <ul style="list-style-type: none"> <li>• Types of communication channel</li> <li>• Methods of connecting devices and transmitting data across and between</li> </ul>  | What are the different types of network (e.g. LAN. PAN VPN). | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson. Draw learners' attention to different types of network (e.g. LAN. PAN VPN).</li> <li>• <b>Independent learning activity:</b> Learners to conduct research and draw on their own experiences to produce notes on different types of network, such as the components required to form the network, benefits, drawbacks etc.</li> </ul> <p>Network types:</p>   | To understand the different types of network, such as the components required to form the network, benefits, drawbacks etc.          | Learners to produce an information sheet on different types of network, such as the components required to form the network, benefits, drawbacks etc. | Lit<br>Social<br>So8<br>C3<br>Sp2<br>Sp5 |

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|    | <p>computer systems</p> <ul style="list-style-type: none"> <li>The selection of connection methods to fulfil specific tasks and functions</li> </ul> <p><b>F2 Flow charts and system diagrams</b></p>  |  | <p><a href="http://www.tutorialspoint.com/data_communication_computer_network/computer_network_types.htm">http://www.tutorialspoint.com/data_communication_computer_network/computer_network_types.htm</a></p> <p>Network types CompTIA (3.5 minutes):</p> <p><a href="https://www.youtube.com/watch?v=HIZQBFMQ_ew">https://www.youtube.com/watch?v=HIZQBFMQ_ew</a></p> <ul style="list-style-type: none"> <li><b>Class discussion:</b> As a class, discuss findings and share ideas.</li> </ul> <p>NB: If time and resources allow, supplement/extend this lesson with a practical activity that allows learners to create different small-scale networks</p>  |  |  |  |
| 73 | <p><b>E1 Transmitting data</b></p> <ul style="list-style-type: none"> <li>Types of communication channel</li> <li>Methods of connecting devices and transmitting data across and between computer systems</li> <li>The selection of connection methods to</li> </ul> | <p><b>What are the factors affecting the choice of connection methods?</b></p> | <ul style="list-style-type: none"> <li><b>Lead-in:</b> Introduce the lesson. Use Q&amp;A to check learners understanding from last lesson.</li> <li>Synchronous vs asynchronous data exchange (1.5 minutes):<br/><a href="http://homepages.uel.ac.uk/u0306091/Network.htm">http://homepages.uel.ac.uk/u0306091/Network.htm</a></li> <li><b>Class discussion:</b> Explore the factors affecting the choice of connection methods.</li> <li><b>Individual activity:</b> Provide learners with a vocational scenario detailing the use of different connections (the scenario should contain examples of good and not so good practice). Learners to evaluate the choices made and suggest improvements and alternatives, as appropriate.</li> </ul> | <p>Deep Assessment in Purple books on topics learnt over the last couple of weeks – with exam style question</p> | <p>Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision.</p> | <p>Lit<br/>Social<br/>So8<br/>C3<br/>Sp2<br/>Sp5</p> |

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|    | <p>fulfil specific tasks and functions</p> <p><b>F2 Flow charts and system diagrams</b></p> |   |   |   |   |   |
| 74 | <p><b>E1 Transmitting data</b></p> <p>Asynchronous and synchronous data transmission</p>    | <p><b>What are the features and uses of asynchronous and synchronous data transmission?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the purpose of the lesson – to explore the features and uses of asynchronous and synchronous data transmission.<br/>Circuit switching and packet switching (2.5 minutes):<br/><a href="https://www.youtube.com/watch?v=3_EHaM3tr98">https://www.youtube.com/watch?v=3_EHaM3tr98</a><br/>Packet switching (2 minutes):<br/><a href="https://www.youtube.com/watch?v=pWLSS9fFhiM">https://www.youtube.com/watch?v=pWLSS9fFhiM</a></li> <li>• <b>Individual learning activity:</b> Using individual research, learners should produce notes on asynchronous and synchronous data transmission and their uses in computer systems (including benefits and drawbacks of each).</li> </ul> | Exam-style questions on the topics covered.               | Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision. | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |
| 75 | <p><b>E1 Transmitting data</b></p> <p>Asynchronous and synchronous data transmission</p>    | <p><b>What are the features and uses of packet data and packet switching?</b></p>               | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the purpose of the lesson – to explore the features and uses of packet data and packet switching.</li> <li>• <b>Individual learning activity:</b> Using individual research, learners should produce notes on the features and contents of packet</li> </ul>   | Exam-style questions on packet data and packet switching. | Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key   | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    |   |   | data and the uses, benefits and drawbacks of packet switching  |   | points and notes to aid their revision.   |   |
| 76 | <p><b>E1 Transmitting data</b></p> <p>Protocols used to govern and control data transmission</p>    | <p><b>What are the concept of protocols and what are they used for?</b></p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson. Explain the concept of protocols (what they are used for and why).<br/>UDP and TCP: comparison of transport protocols (11.5 minutes):<br/><a href="https://www.youtube.com/watch?v=Vdc8TCESIg8">https://www.youtube.com/watch?v=Vdc8TCESIg8</a></li> <li>• <b>Independent learning activity:</b> Learners to conduct research on the protocols used for a range of computing tasks.</li> <li>• <b>Class discussion:</b> As a class, discuss findings and share ideas.</li> </ul>  | Clear explanation of what the concept of protocols are and why they are used? | Learners to produce a Revision task – they are to make notes on what they have learnt over the last couple of sessions and produce well-organised key points and notes to aid their revision. | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |
| 77 | <p><b>E1 Transmitting data</b></p> <p>The features, applications and implications of encryption</p> | <p>What are the features, applications and implications of encryption?</p>  | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Provide learners with a message scrambled using a simple substitution cipher. Get learners to decode the message using a provided key. Use this activity as an introduction to the concept of encryption.</li> <li>• <b>Tutor presentation(s):</b> Provide overviews of: <ul style="list-style-type: none"> <li>○ Caesar and Vigenere ciphers</li> <li>○ ymmetric key encryption</li> <li>○ public key encryption.</li> </ul> </li> </ul> <p><a href="http://www.cryptomuseum.com/crypto/vigenere/">http://www.cryptomuseum.com/crypto/vigenere/</a></p> <p><a href="http://www.webopedia.com/TERM/S/symmetric_key_cryptography.html">http://www.webopedia.com/TERM/S/symmetric_key_cryptography.html</a></p> | Respond to short exam-style questions on uses and implications of encryption. | PG Online book exercises pg 94/6  | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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|    |  |   | <p><a href="http://computer.howstuffworks.com/encryption3.htm">http://computer.howstuffworks.com/encryption3.htm</a></p> <ul style="list-style-type: none"> <li>• <b>Independent learning activity 1:</b> Learners to conduct research on data encryption used to protect stored and transmitted data.</li> <li>• <b>Independent learning activity 2:</b> Learners to use ciphers and encryption to protect and decode data.</li> <li>• <b>Plenary:</b> As a class, discuss findings and share ideas.</li> </ul>   |   |   |   |
| 78 | <p><b>E1 Transmitting data</b></p> <ul style="list-style-type: none"> <li>• Types of compression</li> </ul> <p>The applications and implications of data compression</p> | <p>What is the concept of compression, what is it used for and why, how does it work?</p> | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson. Explain the concept of compression (what it is used for and why, how it works etc).<br/>Data compression:<br/><a href="http://www.webopedia.com/TERM/D/data_compression.html">http://www.webopedia.com/TERM/D/data_compression.html</a><br/>Data compression as fast as possible (5 minutes):<br/><a href="https://www.youtube.com/watch?v=quo8if4Yxhw">https://www.youtube.com/watch?v=quo8if4Yxhw</a></li> <li>• <b>Independent learning activity:</b> Based on independent research, learners should produce a technical 'help manual' explaining the concept of compression, different types of compression (including codecs) and their applications, including the implications for individuals and organisations.</li> </ul> | <p>Mock Assessment to discover any gaps in learning – bridge gaps before exam</p> | <p>Symmetric key encryption is used a lot less than public key encryption. Why is this? How does public key encryption actually work?</p> <p>Research on the keys used by each of these encryption methods, and find out what the keys do.</p> <p>Ext: Public key encryption uses two keys, a public key and a private key. How are these public key to decrypt data sent out using that key?</p> | <p>Lit</p> <p>Social</p> <p>So8</p> <p>C3</p> <p>Sp2</p> <p>Sp5</p> |

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| 79      | <b>E3 Error correction</b> | What is the concept of error detection when transmitting data | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the lesson. Explain the concept of error detection and error correction when transmitting data.</li> <li>• <b>Independent learning activity:</b> Learners to conduct research and make notes on error detection and correction systems as listed in Topics E2 and E3<br/>Error detection and correction:<br/><a href="http://www.tutorialspoint.com/data_communication_computer_network/error_detection_and_correction.htm">http://www.tutorialspoint.com/data_communication_computer_network/error_detection_and_correction.htm</a></li> <li>• <b>Class discussion:</b> As a class, discuss and share findings.</li> </ul> | <p>Assessment practice pg 115 BTEC book – Use a seven letter word to demonstrate how to use a Vigenère cipher to encode a word. Write a brief description of how you encrypted the word. Produce a guide to methods used by computer systems to detect errors from data transmission.</p> <p>You should:</p> <ul style="list-style-type: none"> <li>• Explain how a computer system can use even parity checks</li> <li>• Describe and compare how ARQ and FEC are used in error correction systems.</li> </ul> | Learners to be given the Specification – they are then to go through and highlight areas they feel confident in – the ones that they do not feel confident in they need to go over their class notes and produce revision notes for them. | Lit<br>Social<br>So8<br>C3<br>Sp2<br>Sp5 |
| 80 - 84 | <b>Whole specification</b> | Revision  | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the purpose of the lessons: – to look at how to improve performance on the extended writing questions.</li> </ul>   | <ul style="list-style-type: none"> <li>• Example extended questions.</li> </ul>   |   | Lit<br>Social<br>So8                     |

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|       |                            |          | <ul style="list-style-type: none"> <li>• <b>Tutor presentation:</b> Reiterate the meaning of different command words. For each of the 'extended writing' command words, look at the structure of the level-based mark schemes and what the descriptors mean.</li> <li>• <b>Individual tasks:</b> Give learners examples of extended questions from either the SAMs, past papers or ones that the tutor has prepared. Allow them to respond to these in exam conditions. Tutors could provide example responses that learners could critique.</li> <li>• <b>Small-group tasks:</b> Learners should discuss/share their interpretations of the questions. They could do a peer marking activity.</li> </ul> | <ul style="list-style-type: none"> <li>• Level-based mark schemes.</li> <li>• Example responses.</li> </ul>  |  | C3<br>Sp2<br>Sp5                                 |
| 85-90 | <b>Whole specification</b> | Revision | <ul style="list-style-type: none"> <li>• <b>Lead-in:</b> Introduce the purpose of the lessons – to allow learners to work on areas of the specification they find challenging. Ask them to look through the specification (and their work from the last few lessons) and identify where they think they need additional focus.</li> </ul> <p><b>Tasks:</b> Provide 'stations' in different areas of the room that learners can use, based on their areas of weakness.</p>   | <ul style="list-style-type: none"> <li>• Example questions.</li> <li>• Example mark schemes.</li> <li>• Example responses.</li> <li>• Specifications.</li> </ul> |  | Lit<br><br>Social<br><br>So8<br>C3<br>Sp2<br>Sp5 |