

Component 3: Effective Digital Working Practices

Delivery of this component

Within this component, students will learn:

- about how current and modern technologies are used, and their impact on organisations and their stakeholders. Students will learn the ways in which organisations and associated individuals use modern technologies to exchange information, communicate and complete work-related tasks and the impacts these have on the way organisations perform tasks
- about the increased reliance of organisations on digital systems to hold data and perform vital functions, and the range of challenges and dangers this presents. Students will learn the nature of threats to digital systems and ways that they can be mitigated through organisation policy, procedures and the actions of individuals
- about the wider implications of digital systems and their use. Students will learn about how legislation covering data protection, computer crimes and intellectual property has an impact on the way that organisations and individuals use digital systems and data. Students will learn the procedures that organisations must follow in order to conform to legal requirements and professional guidelines
- about how individuals in the digital sector plan solutions and communicate meaning and intention. Students will learn how different forms of written and diagrammatical communication can be used to express understanding and demonstrate the flow of data and information.

Assessment guidance

This unit is externally assessed through a test that is set and marked by Pearson. Questions will require students to demonstrate knowledge and understanding of the given scenarios or contexts. Assessments are available twice a year: February and May/June from 2020 onwards. Sample assessment materials will be available to help centres prepare students for assessment.

Component title	Effective Digital Working Practices
Guided learning hours	48
Number of lessons	48
Duration of lessons	1 hour

Lesson	Topic from specification	Suggested activities	Classroom resources
Teaching content A: Modern technologies			
1	Communication technologies [Component 3, A1, Modern technologies]	<p>Introductory activity</p> <ul style="list-style-type: none"> Students work in small groups and discuss their experience of transferring data such as images from one device to another. <p>Main session activities</p> <ul style="list-style-type: none"> Students are introduced to the following areas: ad hoc networks, open networks, performance issues and issues affecting network availability. If allowable within the centre, ask students to take out their mobile phones and see what signal strength they have. Ask students: Does this differ on different phone networks? Does it differ in different areas? Students work with a partner to create a presentation describing the network availability issues in the area they live. If students are not aware of the factors in their local area, then students can be given information about the school's local environment. This can include the location, available infrastructure, mobile phone coverage and blackspots. If time, students can share their presentation with the class. 	<p>Mobile phone devices, if allowable under centre policy.</p> <p>Access to the internet to research the different communication technologies.</p> <p>Presentation software.</p> <p>Information about the infrastructure in the local area, including available infrastructure, mobile network coverage and blackspots.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p>Plenary activities</p> <ul style="list-style-type: none"> • Students confirm their understanding of an ad hoc network. • Students give examples of security issues with open networks and the issues affecting network availability. 	
2	<p>Cloud storage [Component 3, A1, Modern technologies, Features and uses of cloud storage]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the use of cloud storage could impact on managing a project.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students consider how they store their own files and list the different types of files they store in the cloud. • It is likely that students will connect their mobile phones to the cloud. Ask students to talk about what they store on the cloud. If possible, ask students to talk about their experiences of restoring their devices from the cloud. <p>Main session activities</p> <ul style="list-style-type: none"> • Introduce students to the different features of cloud storage, including access rights, synchronisation, 24/7 availability and scalability. • Students work with a partner and investigate a cloud storage service. Students should research the features available within the cloud storage service. • Students assess the free and paid-for services to determine if the number and quality of features available differ. • Students access and read the services' privacy policies and share their findings with the class. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students confirm their understanding of streaming and the difference between data stored on their phone/device and data stored in the cloud. • Students explain the importance of backing up files to the cloud. 	<p>Access to the internet to research a cloud storage provider such as Dropbox™ or Google Drive™.</p>

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3	<p>Cloud computing [Component 3, A1, Modern technologies, Features and uses of cloud computing]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the use of cloud computing could impact on managing a project.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students explain how they know which applications are stored on a PC and which are accessed via the cloud. <p>Main session activities</p> <ul style="list-style-type: none"> Introduce students to the different features of cloud computing, including online applications, version consistency, sharing files and collaboration tools/features. If possible, students create a document using Word Online and save to their local area. Students then open the file in the word-processing software installed on a PC and make minor changes to the document. Students discuss with the class how similar the word-processing environments are. Students work with a partner to investigate a local organisation that uses cloud computing and the benefits of using cloud computing to an organisation. <p>Plenary activities</p> <ul style="list-style-type: none"> Students explain three benefits of using online applications. Students explain the need for consistency between software applications used by different users collaborating on the same file and the importance of tracking changes. 	<p>Access to the internet. Students will need access to an online word processor such as Microsoft® Word Online or Google Docs™.</p> <p>Students will also need access to a similar type of software that is installed on the centre network.</p> <p>Case studies of local organisations that use cloud computing.</p>
4	<p>Selection of platforms and services [Component 3, A1, Modern technologies, How the selection of platforms and services impacts on the use of cloud technologies]</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students think about a time they have worked on a task over different devices, and the benefits and drawbacks of this. Students discuss their ideas with the class. For example, this could include working on a document or sending emails from different devices. 	<p>Access to the internet.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p>

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	<p>Students could reflect on what they covered in Component 1, A3 Design principles. Students should reflect on how the user interface and its use of design principles impacts on how cloud technologies are used by individuals and organisations.</p>	<p>Main session activities</p> <ul style="list-style-type: none"> • Introduce students to the difference between traditional systems and cloud systems. • Then introduce students to how traditional systems and cloud systems work together, including: device synchronisation, online/offline working and notifications. • Students are given a device to investigate and should research the device and describe the technologies that contribute to the platform. • Students select an application that uses cloud technology and is available on different platforms. Students compare the different interfaces and functionality available. • Working in groups, students work on the Moov2gether case study. • Case study: Moov2gether is a national chain of estate agents that have offices and a website. Their managing director has been investigating how they can improve their digital working practices by making better use of cloud technologies while observing data protection principles and ethical concerns regarding their customers' data. • In groups, students make a list of possible platforms and services that Moov2gether could use to improve their employees' work practices and their customers' user experience, while still observing data protection principles and considering ethical concerns. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students explain the term 'platform' and give attributes that can affect a platform's available applications and services. • Students give an example of using cloud technologies on different platforms. 	

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		<ul style="list-style-type: none"> Students provide examples of factors that may impact the use of cloud technologies on a mobile device. 	
5	Using cloud and traditional systems together [Component 3, A1, Modern technologies, How cloud and 'traditional' systems are used together]	<p>Introductory activity</p> <ul style="list-style-type: none"> Students consider what it is like when they buy a new device such as a mobile phone or tablet. Ask students if they like to start afresh or synchronise their new devices to existing ones. Students think about the services they have had to synchronise before they can be used on a new device. <p>Main session activities</p> <ul style="list-style-type: none"> Students watch a video on backing up and synchronising content between devices. Students create a short, step-by-step guide that explains how to backup and synchronise media between two different devices of their choice. Students should include the possible challenges that they may face when doing this and how to overcome them. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain why content should be synchronised between devices and systems. Students explain how a personal hotspot helps with synchronisation. 	Access to the internet to research how to synchronise one device to another device. Backing up and synchronising content video (search YouTube™, e.g. synchronising content between devices).
6	Choosing cloud technologies [Component 3, A1, Modern technologies, Implications for organisations when choosing cloud technologies]	<p>Introductory activity</p> <ul style="list-style-type: none"> Students work in pairs and identify at least three different considerations a school may have when choosing an appropriate cloud technology. Students should then consider how this could be different to an individual and why an individual's considerations may be different. 	Access to the internet to research the implications of cloud technologies. Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.

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		<p>Main session activities</p> <ul style="list-style-type: none"> • Introduce students to the different implications for organisations when choosing cloud technologies, including: disaster recovery considerations, security of data, compatibility, maintenance, getting the service/storage up and running and performance considerations. • Students work on the Moov2gether case study. • Case study: Moov2gether is trying to decide which technologies to use to ensure that its data is secure and can be recovered quickly. • In pairs students write the text of an email message to the manager of Moov2gether detailing their suggestions. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students describe how cloud technologies can support an organisation's disaster recovery policies. • Students give ways a third-party cloud technology provider keeps an organisation's data safe. • Students give three security standards that are internationally recognised. 	<p>Word-processing/email software to record their findings.</p>
7	<p>Maintenance, set up and performance considerations [Component 3, A1, Modern technologies, Implications for organisations when choosing cloud technologies]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on the</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students identify three possible issues that organisations might have when using cloud technologies. Students can refer back to what they learned in the previous lesson. <p>Main session activity</p> <ul style="list-style-type: none"> • Reinforce the different implications for organisations when choosing cloud technologies including: disaster recovery considerations, security of data, compatibility, maintenance, getting the service/storage up and running and performance considerations. 	<p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p> <p>Word-processing software to record their findings.</p>

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	<p>use of modern technologies and their impacts on being able to manage projects to meet project requirements.</p>	<ul style="list-style-type: none"> • Students work on the Moov2gether case study. • Case study: The managers at Moov2gether are trying to decide whether to invest in a new server or to move to cloud technologies. • Students think about the advice they would give them by comparing the two alternatives. Students should talk about maintenance as well as setting up the technologies. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students explain why downtime might be reduced with a cloud computing solution. • Students give two drawbacks of cloud computing. 	
8	<p>Collaborative technologies [Component 3, A2, Impact of modern technologies, How modern technologies can be used to manage modern teams]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how collaborative technologies can be used to manage projects.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students think about a time when they may have lost some work on the computer; for example, a piece of homework. Students then talk about what happened and why they lost their work. • In small groups students list the different technologies they could use to communicate or collaborate with others when they are working on a project. <p>Main session activities</p> <ul style="list-style-type: none"> • Introduce students to the changes to modern teams facilitated by modern technologies, including world teams, multiculturalism, inclusivity, 24/7/365 and flexibility. • Students watch a video demonstrating collaborative software being used. If possible, the teacher could demonstrate this software to the class. • Students draw a spider diagram with all of the different tasks that an estate agent may perform. • Students use this information to explain to the owner of an estate agency how they could use collaborative software 	<p>Access to the internet</p> <p>Collaborative content video (search YouTube, e.g. collaborative software in use)</p> <p>Case studies of the tasks that would be carried out by an estate agent.</p>

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		<p>to enable collaborative working between staff in different offices.</p> <p>Plenary activities</p> <ul style="list-style-type: none"> • Students explain what is meant by the term '24/7/365'. • Students give examples of how collaborative technologies benefit inclusivity in the workplace and describe how they can promote inclusivity. 	
9	<p>Using modern technology when managing teams: communication and collaboration</p> <p>[Component 3, A2, Impact of modern technologies, How modern technologies can be used to manage modern teams]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how modern technologies can be used to manage projects.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students look at the features of chat software and write down how often they use the software for schoolwork and for social purposes. <p>Main session activities</p> <ul style="list-style-type: none"> • Reinforce the changes to modern teams facilitated by modern technologies, including world teams, multiculturalism, inclusivity, 24/7/365 and flexibility. • Students work in pairs and create a presentation on a topic of their choice. They should use an online platform such as Google Slides™. • Students should work on the same presentation at the same time, but not communicate verbally with each other while they are creating the presentation. • When students have completed this, they discuss how easy they found this task, and the benefits and drawbacks this type of software has for organisations. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students explain why dashboards are useful tools to help teams to work together. • Students give benefits of using inter-office communication tools and explain why scheduling helps teams work better together. 	<p>Access to the internet to research how technology can be used to manage teams.</p> <p>Access to online software such as Google Slides.</p>

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10	<p>Using modern technology when managing teams: scheduling and planning</p> <p>[Component 3, A2, Impact of modern technologies, How modern technologies can be used to manage modern teams]</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students consider how they remember important events and what they use to record them. Ask students if they synchronise their electronic diaries/events with other family members. Ask students how useful they find this. <p>Main session activities</p> <ul style="list-style-type: none"> Introduce students to how modern technologies can be used to manage modern teams, including collaboration tools, communication tools, scheduling and planning tools. Students use scheduling and planning software and, if necessary, use their email software's diary functionality, to add and edit at least four events that reflect their homework schedule. Students use the recurring function that automatically copies repeating events into the same day each week or month. Students explain the benefits and drawbacks of using software to schedule tasks. Students consider using scheduling like this in the future. <p>Plenary activity</p> <ul style="list-style-type: none"> Students give benefits of using software to manage project teams and explain how they could use planning software to manage their own activities. 	<p>Access to the internet to research how technology can be used to manage teams.</p> <p>Access to scheduling and planning software to be used to setup and edit a diary. This could be available within the centre's email services.</p>
11	<p>Communication with stakeholders</p> <p>[Component 3, A2, Impact of modern technologies, How organisations use modern technologies to communicate</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students find out which communications platforms are used the most by their classmates and why. <p>Main session activities</p> <ul style="list-style-type: none"> Introduce students to how modern technologies can be used to communicate with stakeholders, including: 	<p>Access to the internet.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p>

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	with stakeholders]	<p>communication platforms and selection of appropriate communication channels.</p> <ul style="list-style-type: none"> • Students consider a range of different channels; for example, websites, social media, email, voice communication, live chat. • In pairs, students discuss which channels are best suited for private communications or for public communications. Students then share answers with the class. • Students work on the Moov2gether case study. • Case study: Moov2gether has many branches across the country. In each office there is a team of agents that looks after property sales in its local area. An important aspect of selling a house may be meeting clients outside normal working hours to carry out viewings, negotiate offers from potential buyers and keep homeowners informed of progress. • Students list five options of how Moov2gether could use modern technologies to communicate with their stakeholders. Students should explain how they would use them. For example, emailing a purchase offer to a homeowner. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students recommend three communication channels a teacher could use to advertise a forthcoming school trip and explain why they have chosen these channels. • Students consider using the same channels to advertise to parents and suggest alternatives if needed. 	
12	Accessibility and inclusivity [Component 3, A2, Impact of modern technologies, How modern technologies aid	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students work in pairs and discuss what is meant by the term 'accessibility need' and the different types of needs that different users may have. 	<p>British Dyslexia Association: www.bdadyslexia.org.uk</p> <p>Two separate images for students to describe.</p>

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	<p>inclusivity and accessibility]</p> <p>Students could reflect on what they covered in Component 1, A2 Audience needs. Students should reflect on the different methods that can be used to ensure users with different accessibility needs, skill levels and demographics can access modern technologies and services.</p>	<p>Main session activities</p> <ul style="list-style-type: none"> ● Introduce students to how modern technologies aid inclusivity and accessibility, including: interface design, accessibility features and flexibility of working hours and locations. ● Students research which colour combinations are recommended for dyslexic users. Students should use the internet to explore the recommendations of the British Dyslexia Association. ● Students write descriptive text to support an image, making sure they talk about the context as well as the components of the image. They share their description with the class. <p>Plenary activity</p> <ul style="list-style-type: none"> ● Students describe ALT (alternative) text and give examples of accessibility technologies or features. 	
13	<p>How modern technologies impact on the organisation</p> <p>[Component 3, A2, Impact of modern technologies, Positive and negative impacts of modern technologies on organisations]</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> ● Students consider how technology impacts their school. ● The teacher should then pick out random hardware devices and ask students to imagine that the hardware was no longer available. Students should consider how their learning would be different. <p>Main session activities</p> <ul style="list-style-type: none"> ● Introduce students to the benefits and drawbacks of modern technologies on organisations, including: required infrastructure, demand on infrastructure, availability of infrastructure, 24/7, security of distributed data, collaboration, inclusivity, accessibility and remote working. ● Students assess the technology in the classroom. They use the internet to research the price of a basic PC and other hardware they have in the classroom. 	<p>Access to the internet to research the prices of computer equipment found in schools.</p>

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		<ul style="list-style-type: none"> • Students work out the cost of the technology in the room. • Students should then try to analyse the impact of technology on their learning. How might their learning be different if this technology was not available? <p>Plenary activity</p> <ul style="list-style-type: none"> • Students assess the benefits and drawbacks new technology could have on an organisation and the benefits and drawbacks of 24/7 accessibility for customers and businesses. • Students explain the main benefits and drawbacks relating to the security of distributed/dispersed data. 	
14	<p>How technologies impact the way organisations operate [Component 3, A2, Impact of modern technologies, Positive and negative impacts of modern technologies on organisations]</p> <p>Students could reflect on what they covered in Component 2, A6 Sectors that use data modelling. Students should reflect on the use of data modelling and how this can impact on organisations.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students examine the school's web pages or VLE and write down five important categories of information they can access. <p>Main session activities</p> <ul style="list-style-type: none"> • Reinforce the benefits and drawbacks of modern technologies on organisations, including: required infrastructure, demand on infrastructure, availability of infrastructure, 24/7, security of distributed data, collaboration, inclusivity, accessibility and remote working. • Students research online-meeting software, such as GoToMeeting™ and then create a one-page flyer explaining the software and including images. • Students work on the Moov2gether case study. • Case study: Moov2gether has decided to trial a remote working scheme. • Students create a single presentation slide with their ideas for what infrastructure is required to support this type of working pattern. 	<p>Access to the internet to research the impacts of modern technology on organisations.</p> <p>GoToMeeting: www.gotomeeting.com/en-gb</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p> <p>Access to Google Slides/PowerPoint®.</p>

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		<p>Plenary activity</p> <ul style="list-style-type: none"> Students give examples of technologies that promote collaboration within an organisation and explain the benefits and drawbacks of remote working. 	
15	<p>How technology impacts individuals [Component 3, A2, Impact of modern technologies, Positive and negative impacts of modern technologies on individuals]</p> <p>Students could reflect on what they covered in Component 2, A7 Threats to individuals. Students should reflect on how individuals could be threatened by modern technologies.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students examine the technologies they have access to and identify what they do most with the technology, for example, a PC for schoolwork and a tablet to play games. <p>Main session activities</p> <ul style="list-style-type: none"> Introduce students to the benefits and drawbacks of modern technology on individuals, including: flexibility, working styles and impact on mental wellbeing. Students write a letter to someone who is thinking about taking a job that requires them to work from home. Include in the letter the benefits and drawbacks of using modern technologies to work from home. Students work on the Moov2gether case study. Case study: Moov2gether is concerned about the welfare of its employees who work remotely. Students create a leaflet that can be issued to new staff advising them on how to recognise issues of mental wellbeing that may stem from the use of different working styles. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain how technology can make them more productive and give examples of how their mental health can be negatively impacted by technology. 	<p>Access to the internet to research the impacts of modern technology on individuals.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p> <p>Word-processing software to write a letter.</p>
16	<p>Component 3: assessment practice Preparation for assessment</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Teacher talks the class through how they will be assessed in Component 3 as part of the synoptic assessment and 	<p>Practice questions covering Section A of the specification.</p>

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		<p>answers any questions.</p> <ul style="list-style-type: none"> The teacher then tells students that they will be completing some practice questions from Section A of the specification. <p>Main session activity</p> <ul style="list-style-type: none"> The teacher should then give students practice questions and recap the meaning of each of the command words with students before they start. Students complete a practice assessment activity, referring to their own notes from previous sessions. <p>Plenary activity</p> <ul style="list-style-type: none"> Students should reflect on any questions they found difficult and the possible reasons why. For example, students should consider if they struggled because of subject knowledge or not understanding the command word. 	
Teaching content B: Cybersecurity			
17	Why systems are attacked [Component 3, B Cybersecurity, B1 Threats to data]	<p>Introductory activity</p> <ul style="list-style-type: none"> Students think about why people attack digital systems. Students then give reasons why a financial organisation such as a bank might be attacked and why someone might want to attack a social media website. <p>Main session activities</p> <ul style="list-style-type: none"> Students consider the motivating factors for attacking digital systems. These can include: fun/challenge, industrial espionage, financial gain, personal attack, disruption and data/information theft. Students work on the Moov2gether case study. Case study: Earlier in the year Moov2gether experienced a serious attack on its digital systems. 	<p>Access to the internet to research the reasons why systems are attacked.</p> <p>Suitable software to create a wiki.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p>

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		<ul style="list-style-type: none"> Students create a wiki for the organisation's intranet that educates staff about the reasons why systems are attacked so that the staff are more aware of potential threats. <p>Plenary activities</p> <ul style="list-style-type: none"> Students give reasons for attacks on digital systems and a personal cyberattack on an organisation. Students then explain the types of common disruption an organisation might experience through a cyberattack. Students describe the type of personal data/ information often stolen and sold to other criminals. 	
18	<p>External threats to digital systems and data security [Component 3, B Cybersecurity, External threats (threats outside of the organisation) to digital systems and data security]</p> <p>Students could reflect on what they covered in Component 2, A4 Data collection: big data. Students should reflect on their work on big data and what data is collected. Students should then reflect on the impact of this data being access by an external threat.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Teacher to introduce the idea that threats can be internal or external. Then briefly tell students the difference between the two. The teacher then tells students that today they will be focusing on external threats. Students search online to find two recent ransomware news stories. They consider how the organisations and individuals targeted were affected. <p>Main session activity</p> <ul style="list-style-type: none"> Students are introduced to different external threats, including: unauthorised access, malware, denial of service, phishing, pharming, social engineering, shoulder surfing and man-in-the-middle attacks. Students work alone to create a wiki detailing external threats to digital systems and data, and advising users on how they can protect against them. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain what a denial of service attack is and identify the technology that helps prevent the spread of 	<p>Access to the internet to research different external threats.</p> <p>Suitable software to create a wiki.</p>

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		<p>phishing emails.</p> <ul style="list-style-type: none"> Students give common forms of malware. 	
19	<p>Internal threats to digital systems and data security [Component 3, B Cybersecurity, Internal threats (threats within the organisation) to digital systems and data security; Impact of security breach]</p> <p>Students could reflect on what they covered in Component 2, A4 Data collection: big data. Students should reflect on their work on big data and what data is collected. Students should then reflect on the impact of this data being access by an internal threat.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students quickly recap the difference between an internal and an external threat. Students are told that they will learn the different internal threats today. Students list the type of actions unhappy or disgruntled employees could perform to disrupt digital systems and data security. <p>Main session activity</p> <ul style="list-style-type: none"> Students are introduced to the different internal threats, such as unintentional disclosure of data, intentional stealing or leaking of information, user overriding security controls, use of portable storage devices, downloads from the internet and visiting untrustworthy websites. Students work in pairs and investigate potential threats that could occur if an employee attempted to override security controls and download files or applications from untrustworthy websites. Students consider what could happen to the organisation's systems and then discuss their ideas in a small group. <p>Plenary activities</p> <ul style="list-style-type: none"> Students give common forms of internal threats and identify longer-term impacts of a security breach. Students explain what type of device is commonly used to copy and remove data from an organisation. Students explain how security breaches could negatively impact an organisation's public image. 	<p>Access to the internet to research different internal threats.</p>

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20	User access restriction [Component 3, Prevention and management of threats to data; User access restriction]	<p>Introductory activity</p> <ul style="list-style-type: none"> Students consider the user access restrictions that are used in school. Students should consider what they can and cannot access. Students should then give their reasons for this. <p>Main session activity</p> <ul style="list-style-type: none"> Introduce students to the different user access restrictions, including: locks, passwords, biometrics and two-factor authentication. Students work in pairs and discuss the different ways an organisation could secure its offices and digital systems. Students give reasons why for the security measures they think would be most effective. <p>Plenary activity</p> <ul style="list-style-type: none"> Students give examples of physical security that an organisation might use to secure its data. Students explain what two-factor authentication is and give an example. 	Access to the internet to research cybersecurity prevention methods.
21	Data level protection: firewalls and anti-virus software [Component 3, Prevention and management of threats to data; Data level protection]	<p>Introductory activity</p> <ul style="list-style-type: none"> Students identify the data level protections installed on their classroom computers and write a short description of their purpose. <p>Main session activities</p> <ul style="list-style-type: none"> Introduce students to the purpose of firewall and anti-virus software. Students work in pairs to brief a group of local small businesses about using firewall and anti-virus protection and why it is important. Students create a series of presentation slides to explain the purpose and benefits of this protection. 	Access to the internet to research the purpose of firewall and anti-virus software. Suitable presentation software such as Google Slides/ PowerPoint®.

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p>Plenary activities</p> <ul style="list-style-type: none"> • Students explain the terms ‘firewall’ and ‘session cookies’. • Students explain why passwords should be obscured when they are keyed in by the user and why using autocomplete is a security risk. 	
22	<p>Data level protection: device hardening and encryption [Component 3, Prevention and management of threats to data; Data level protection]</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students investigate their PCs to check when the anti-virus software was last updated. <p>Main session activities</p> <ul style="list-style-type: none"> • Students should be introduced to what device hardening means, including encryption. • Students investigate potential vulnerabilities in a digital system and apply device hardening to identify known flaws or weaknesses. • Students research appropriate techniques to harden the device, for example apply security patches, and apply these techniques to harden the device and then confirm the flaw or weakness has been removed. If this is not possible, then students could write a report on what they would have done. <p>Plenary activity</p> <ul style="list-style-type: none"> • Students explain why it is important to use encryption when transmitting data and give benefits of using a digital signature when transmitting a file. 	<p>Access to the internet to research device hardening techniques.</p>
23	<p>Finding weaknesses and improving system security [Component 3, Prevention and management of threats to data; Finding weaknesses and improving system security]</p>	<p>Introductory activities</p> <ul style="list-style-type: none"> • Students think about their PCs and devices and how they require updating from time to time to fix identified vulnerabilities that can leave the device open to attack. • Students identify the type of data that could be lost or stolen if their device is attacked. 	<p>Access to the internet to research the different ways that network security vulnerabilities can be found.</p> <p>Copies of Moov2gether case study (as outlined in ‘Main session activities’ section for this lesson) or</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p>Main session activities</p> <ul style="list-style-type: none"> ● Introduce students to the different ways that security weaknesses can be identified, including: ethical hacking, penetration testing and analysing system data/behaviours to identify potential risks. ● Students work on the Moov2gether case study. ● Case study: Moov2gether has hired an ethical white hat hacker to perform a penetration test of their digital systems. ● Students write an email that the managing director can send to staff explaining why the company has hired an ethical white hat hacker to perform a penetration test of their digital systems. Students should consider how employees may be affected and what the company hopes this testing will achieve. ● Students work in groups to discuss how users may feel if their accounts are hacked into – even though it is for a genuine reason. ● Students identify the benefits and drawbacks of this type of testing. <p>Plenary activity</p> <ul style="list-style-type: none"> ● Students give reasons why organisations might use ethical hackers and give an example of how organisations use penetration testing to find weaknesses in a system. 	<p>teachers can create their own case studies if preferred.</p>
24	<p>Security policies [Component 3, B3 Policy]</p>	<p>Introductory activities</p> <ul style="list-style-type: none"> ● Students think about security at their school or college and how checks are made: for example, ID badge, log-in details, use of USBs, etc. ● Students write down the rules that they must follow in their school or college. ● Students should consider their responsibility when using 	<p>Examples of security policies.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p>their school or college network. They should then consider the school's or college's responsibility.</p> <p>Main session activities</p> <ul style="list-style-type: none"> ● Students work in pairs and review examples of policies and highlight the key points. ● Students compare policies and discuss their findings with the class. <p>Plenary activity</p> <ul style="list-style-type: none"> ● Students describe the key components of two types of policy and why they are important, and explain why disaster recovery policies are essential and which systems should be prioritised. 	
25	<p>Defining security parameters: passwords</p> <p>[Component 3, B3 Policy, Defining security parameters]</p>	<p>Introductory activities</p> <ul style="list-style-type: none"> ● Students think about the online accounts they use, such as email accounts, social media, online shopping etc., and consider how difficult they are making it for a potential attacker to gain access to their personal data. If one account was compromised, how could this affect them? ● Students discuss the potential impact with a partner. <p>Main session activities</p> <ul style="list-style-type: none"> ● Students are introduced to the different security parameters, including: password policy, acceptable software/installation/usage policy and the parameters for device hardening. ● Students take part in a class discussion about password good practice. ● Students design a sample password policy for an organisation. ● Students devise a password to meet the password policy complexity and use an online password checker to test it. 	<p>Access to the internet to research password complexity rules.</p> <p>Online password checker, for example https://howsecureismypassword.net/</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' column for this lesson) or teachers can create their own case studies if preferred.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> • Students work on the Moov2gether case study. • Case study: A recent penetration test has revealed that a lot of Moov2gether employees appear to be using the same password. • Students create a staff guide outlining the steps employees should take to improve their password practice. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students give ways to increase a password's complexity and explain why default passwords should be changed. • Students identify an external threat that often requests users to update passwords. 	
26	Defining security parameters: policies [Component 3, B3 Policy, Defining security parameters]	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students work in small groups and discuss and identify issues of software being installed on workplace devices. <p>Main session activity</p> <ul style="list-style-type: none"> • Students conduct a software audit on a digital system to identify which software has been installed and any potential risks from this software. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students identify the risks of installing and using unapproved software and describe how an acceptable software policy might be enforced. • Students describe what a software audit is and give reasons why employees are not automatically allowed to duplicate software for home use. 	Access to PC with a variety of software installed for students to audit.
27	Actions to take after an attack [Component 3, B3 Policy, Defining security parameters;	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students consider what actions they would take in the event of an attack and what actions they would prioritise. 	Access to the internet to research recent cyberattacks and how organisations dealt with the attack.

Lesson	Topic from specification	Suggested activities	Classroom resources
	Actions to take after an attack]	<ul style="list-style-type: none"> • Students share ideas with the class. <p>Main session activity</p> <ul style="list-style-type: none"> • Students research recent cyberattacks on large organisations and summarise their response to stakeholders. Students should find out how the attacks were investigated, how the organisation responded and how it analysed the experience to learn lessons to improve future actions. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students give examples of an organisation’s stakeholders and the actions that are likely to occur after an attack on an organisation. • Students identify the key questions that should be asked during an organisation’s analysis after it has recovered from an attack. 	
28	Component 3: assessment practice Preparation for assessment	<p>Introductory activity</p> <ul style="list-style-type: none"> • Teacher talks the class through how they will be assessed in Component 3 as part of the synoptic assessment and answers any questions. • The teacher then tells students that they will be completing some practice questions from Section B of the specification. <p>Main session activity</p> <ul style="list-style-type: none"> • The teacher should then give students practice questions and recap the meaning of each of the command words with students before they start. • Students complete a practice assessment activity, referring to their own notes from previous sessions. <p>Plenary activity</p> <ul style="list-style-type: none"> • Students should reflect on any questions that they found difficult and the possible reasons why. 	Practice questions covering Section B of the specification.

Lesson	Topic from specification	Suggested activities	Classroom resources
		For example, students should consider if they struggled because of subject knowledge or not understanding the command word.	
Teaching content C: Sharing data			
29	<p>Sharing data</p> <p>[Component 3, C The wider implications of digital systems; C1 Responsible use, Shared data]</p> <p>Students could reflect on what they covered in Component 2, A4 Data collection: big data. Students should reflect on their work on big data and what data is collected. Students should then reflect on the benefits and drawbacks and the responsible use of this.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students consider what information they knowingly share with others online. Expect that students will mainly talk about the information that they share via social networking. Then introduce students to other methods they may unknowingly use that share information, such as through location settings, transactional data and cookies. Ask students what they think the benefits and drawbacks of sharing data may be. <p>Main session activity</p> <ul style="list-style-type: none"> Students work in pairs on the Moov2gether case study. Case study: At a recent Moov2gether managers meeting, it was decided that the organisation needed to do more to make sure that staff really understand the implications of data sharing. Students create an information leaflet about data sharing that each office can put on its noticeboard. Students should think about the target audience and sections to include. <p>Plenary activities</p> <ul style="list-style-type: none"> Students give an example of why transactional data might be shared and explain why data sometimes needs to be transformed when it is shared. Students give benefits and drawbacks of using shared data. 	<p>Access to the internet to research different data sharing methods and their benefits and drawbacks.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p> <p>Suitable software to create a leaflet.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
30	<p>The impact of technology on the environment</p> <p>[Component 3, C The wider implications of digital systems; C1 Responsible use, Environmental]</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students research what happens to old printers, PCs and monitors in school and how they are disposed of. <p>Main session activities</p> <ul style="list-style-type: none"> Students use the running costs calculator at https://www.ukpower.co.uk/tools/ to calculate how much it costs to run the computers in their classroom. Using the information, students calculate how much it would cost to run all the computers in their school for a day and for a year. Students work in small groups and research Tech Recycle and Aim to Recycle, making notes on what they do and the services they provide. Students work in pairs and create an information leaflet for new Year 7s that explains everyone's responsibilities for school recycling and energy saving activities. <p>Plenary activities</p> <ul style="list-style-type: none"> Students give examples of usage settings that can be adjusted to help reduce the impact of technology. Students identify the main reason for upgrading rather than replacing digital systems and explain at what point most organisations replace rather than upgrade their digital systems. 	<p>Access to the internet:</p> <p>https://www.ukpower.co.uk/tools/running_costs_electricity</p> <p>http://www.tech-recycle.com/</p> <p>http://aimtorecycle.co.uk/</p> <p>Word-processing software to record their findings.</p>
31	<p>Equal access to information and services</p> <p>[Component 3, C The wider implications of digital systems; C2 Legal and ethical, Importance of providing equal access to</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students choose a website and compare how long it takes for the page to load on their PC and on a device such as a smartphone or tablet. Students consider which is faster and which device is easier to use. <p>Main session activities</p> <ul style="list-style-type: none"> Students interview a local small business to find out how 	<p>Access to the internet.</p> <p>Visitors from local businesses.</p> <p>Suitable software to make a questionnaire.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
	<p>services and information]</p> <p>Students could reflect on what they covered in Component 1, C1 Developing a user interface. Students should reflect on how the user interface that they developed followed good ethical practice and provided equal access to all users.</p>	<p>reliant they are on information and what sort of information they need that they do not generate within the organisation.</p> <ul style="list-style-type: none"> Students work in pairs and create a questionnaire that they can use with a small business and share their findings with the class. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain why they think online shopping benefits society, how chat systems benefit organisations and how individuals benefit from services such as online chat and online shopping. 	
32	<p>Legal requirements and professional guidelines</p> <p>[Component 3, C The wider implications of digital systems; C2 Legal and ethical, Importance of providing equal access to services and information]</p> <p>Students could reflect on what they covered in Component 1, C1 Developing a user interface. Students should reflect on how the user interface that they developed followed good ethical practice and provided equal access to all users.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students review an example of one law, one professional guideline and one accepted standard that they must work with in school. <p>Main session activities</p> <ul style="list-style-type: none"> Students work in pairs and choose two different websites and use the checklist to compare each of the sites in relation to the requirements of WCAG. Students work in groups to discuss the benefits of equal access to services and information for organisations, individuals and society. <p>Plenary activities</p> <ul style="list-style-type: none"> Students give an example of discrimination and examples of how legislation is different to accepted standards. Students explain the principles of WCAG. 	<p>Access to the internet to research examples of laws, professional guidelines and accepted standards within schools/colleges.</p> <p>Copies of the WCAG (Web Content Accessibility Guidelines). These can be found at https://www.w3.org.</p>
33	<p>Net neutrality</p> <p>[Component 3, C The wider</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students research net neutrality and how it could affect them. 	<p>Access to the internet to research net neutrality and the Open Internet Code of Practice.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
	implications of digital systems; C2 Legal and ethical, Net neutrality and how this impacts on organisations]	<p>Main session activities</p> <ul style="list-style-type: none"> ● Students research the Open Internet Code of Practice, which supports full and open internet access. Students find out what this means and identify at least six organisations that signed up to the code. They share their answers with the class. ● Students investigate the following questions online. <ul style="list-style-type: none"> ○ How does the potential loss of neutrality affect the ability to provide equal access to services and information? ○ Does this affect an organisation's ability to behave in an ethical manner? ○ What is the potential impact on an individual's rights under data protection legislation? ● Students work on the Moov2gether case study. ● Case study: As a relatively recent start-up, Moov2gether is concerned that its rivals may receive preferential treatment if net neutrality agreements are relaxed in the UK. ● Students create a short document that helps employees to understand the potential impacts on the organisation if net neutrality agreements are relaxed in the UK. <p>Plenary activity</p> <ul style="list-style-type: none"> ● Students explain net neutrality and the Open Internet Code of Practice and give disadvantages of losing net neutrality. 	Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.
34	Acceptable use policies [Component 3, C The wider implications of digital systems;	<p>Introductory activity</p> <ul style="list-style-type: none"> ● Students consider and review acceptable use policies they may have signed in relation to school/college or club activities. 	Access to the internet to research the contents of acceptable use policies. Access to acceptable use policies that students

Lesson	Topic from specification	Suggested activities	Classroom resources
	C2 Legal and ethical, The purpose and use of acceptable use policies, Blurring of social and business boundaries]	<p>Main session activities</p> <ul style="list-style-type: none"> ● Introduce students to the reasons why organisations have acceptable use policies (AUP) in place and what they are likely to include, such as scope, assets, acceptable behaviours, unacceptable behaviours, sanctions and agreements. ● Students work on the Moov2gether case study. ● Case study: Moov2gether employs staff in different roles within the organisation. For example, they have administration staff who upload property details and take them down when the properties are sold. They also keep in contact with potential buyers and inform them of new listings. Area managers at Moov2gether who look after several branches need to monitor the branches and the activities of the staff. ● Students explore the roles of administration staff and the area manager, and suggest occasions where each member of staff might use social media or digital systems for personal or professional activities. <p>Plenary activities</p> <ul style="list-style-type: none"> ● Students explain AUP and its purpose. ● Students give examples of the sanctions an employee may face if they breach an AUP. ● Students explain how social media can be used for business purposes and give examples of how digital systems can impact on an individual's personal life. 	<p>may have signed in relation to school/college.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.</p>
35	Data protection principles [Component 3, C The wider implications of digital systems; C2 Legal and ethical, The	<p>Introductory activity</p> <ul style="list-style-type: none"> ● Students research what rights they have to access data held about them in school/college. Students share their findings with the class. ● Ask students who they would contact if they wanted to 	<p>Access to the internet to research data protection principles and recent changes as a result of GDPR.</p> <p>Copies of Moov2gether case study (as outlined in 'Main session activities' section for this lesson) or</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
	purpose and use of acceptable use policies, Data protection principles]	<p>find information held about them in school/college.</p> <p>Main session activities</p> <ul style="list-style-type: none"> • Introduce students to the different data protection principles that should be followed by organisations that store data about individuals. • Brief outline on the new EU General Data Protection Regulation (GDPR) and what has been added to the principles of the Data Protection Act as a result. • Students work on the Moov2gether case study. • Case study: The managing director of Moov2gether is aware of the changes in data protection law and wants a blog for the company's internal internet pages (intranet) that explains the key principles of the 2018 GDPR legislation to its employees. • Students create a blog for the company's internal internet pages. <p>Plenary activity</p> <ul style="list-style-type: none"> • Students identify as many of the key data protection principles as they can in three minutes. 	teachers can create their own case studies if preferred.
36	Data and the use of the internet [Component 3, C The wider implications of digital systems; C2 Legal and ethical, The purpose and use of acceptable use policies, Data protection principles]	<p>Introductory activity</p> <ul style="list-style-type: none"> • Students consider their online activities and the type of digital footprint they are creating. Students compare their answers with a partner. <p>Main session activity</p> <ul style="list-style-type: none"> • Students explore the data being stored by popular websites they visit by using a web browser to view cookie data being stored by the site. <p>Plenary activity</p> <ul style="list-style-type: none"> • Students explain the terms 'right to be forgotten', 'transactional data'. 	Access to the internet to research the meaning and impacts of digital footprints; for example, browser history of websites visited.

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> Students explain what a tracking cookie is and why it is used. 	
37	<p>Intellectual property</p> <p>[Component 3, C The wider implications of digital systems; C2 Legal and ethical, The purpose and use of acceptable use policies, Dealing with intellectual property]</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students consider how they would feel if their work or art was copied and sold, and what actions they would like to see happen in this situation. <p>Main session activities</p> <ul style="list-style-type: none"> Introduce students to the term ‘intellectual property’ and the methods of identifying and/or protecting intellectual property (IP) (trademarks, patents copyright). Students work on the Moov2gether case study. Case study: Moov2gether is rebranding their business. Students work in pairs to design or create a new logo for Moov2gether. Students then write an email and send it to the senior managers explaining what will need to be done to protect the logo from being copied by competitors. Students work on the Moov2gether case study. Case study: Moov2gether is aware that another company is trading online under a very similar name and using a company logo that customers are mistaking for theirs. Students write a short document in their own words explaining how Moov2gether’s IP can be legally protected. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain the terms ‘patent’ and ‘plagiarism’ and give examples of intellectual property. 	<p>Suitable software to create a new logo.</p> <p>Word-processing/email software.</p> <p>Copies of Moov2gether case study (as outlined in ‘Main session activities’ section for this lesson) or teachers can create their own case studies if preferred.</p>
38	The criminal use of computer systems	<p>Introductory activity</p> <ul style="list-style-type: none"> Students consider what criminals want to do with computer systems that have been hacked and think about 	<p>Access to the internet to research criminal uses of computer systems.</p> <p>Copies of Moov2gether case study (as outlined in</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
	[Component 3, C The wider implications of digital systems; C2 Legal and ethical, The purpose and use of acceptable use policies, The criminal use of computer systems]	<p>the criminal's possible objectives and how they might achieve them.</p> <p>Main session activities</p> <ul style="list-style-type: none"> • Introduce students to the different criminal uses of computer systems, including: unauthorised access, unauthorised modification of materials, creation of malware and intentional spreading of malware. • Students work on the Moov2gether case study. • Case study: Moov2gether is concerned that its data and systems may have been compromised maliciously by some person or organisation using the username and password of two employees who have left the organisation. • Students work in small groups to discuss what Moov2gether should do with its compromised systems. • Students should consider what should be done when employees leave a company, the guidance the company should give to IT staff and what Moov2gether can do to reduce the chance of further malicious compromise and attack. <p>Plenary activity</p> <ul style="list-style-type: none"> • Students give examples of common criminal uses of computer systems and popular routes for spreading malware and describe how malware can be spread. 	'Main session activities' section for this lesson) or teachers can create their own case studies if preferred.
39	Component 3: assessment practice Preparation for assessment	<p>Introductory activity</p> <ul style="list-style-type: none"> • Teacher talks the class through how they will be assessed in Component 3 as part of the synoptic assessment and answers any questions. • The teacher then tells students that they will be completing some practice questions from Section C of the specification. 	Practice questions covering Section C of the specification.

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p>Main session activity</p> <ul style="list-style-type: none"> The teacher should then give students practice questions and recap the meaning of each of the command words with students before they start. Students complete a practice assessment activity, referring to their own notes from previous sessions. <p>Plenary activity</p> <ul style="list-style-type: none"> Students should reflect on any questions that they found difficult and the possible reasons why. For example, students should consider if they struggled because of subject knowledge or not understanding the command word. 	
Teaching content D: Planning and communication in digital systems			
40	<p>Forms of notation</p> <p>[Component 3, D Planning and communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students draw a plan of the digital systems in the classroom, showing how they are connected. <p>Main session activity</p> <ul style="list-style-type: none"> Provide students with an example of a detailed information flow chart. Students work in pairs and write out exactly what is happening in the sequence, including all the important information such as the components, timings and actions as the text version should have no visual clues. Students work in pairs and interpret the rest of the diagram by writing out each of the steps. <p>Plenary activity</p> <ul style="list-style-type: none"> Students give examples of when diagrams are used to document computer systems or processes, and explain the benefits of using diagrams to document processes in an existing or planned digital system. 	<p>Suitable software to draw a plan of the digital systems in their classroom. Alternatively, students may wish to do this on paper.</p> <p>Examples of information flow diagrams. There are many examples available on the internet. Search 'information flow diagram'.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
41	<p>Interpreting data flow diagrams</p> <p>[Component 3, D Planning and communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students research a simple data flow diagram in a book or online and consider if it is clear what the diagram is communicating. <p>Main session activity</p> <ul style="list-style-type: none"> Introduce students to the different flow chart symbols and what they mean. In pairs students use the data flow diagram studied in Lesson 40, making notes about what the diagram shows. They then explain the diagram to a partner. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain what an entity is in relation to data flow diagrams and describe why the direction of the arrows is important. 	<p>Examples of information flow diagrams used in Lesson 40.</p>
42	<p>Interpreting flowcharts</p> <p>[Component 3, D Planning and communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students write down the steps they go through to get ready and get to school/college each day. <p>Main session activity</p> <ul style="list-style-type: none"> Recap the different flow chart symbols and what they mean. Students work in pairs and create a flow chart for the given scenario: A solution is needed for issuing club membership cards. The level of membership is based on a member's age. If 18 or under, the member is classified as a junior; if over 18, the members is an adult. <p>Plenary activities</p> <ul style="list-style-type: none"> Students explain the difference between an input symbol and process symbol in a flow chart, and what a decision box checks. 	<p>Suitable software to draw a flow chart. Alternatively, students may wish to do this on paper.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
43	<p>Interpreting system diagrams</p> <p>[Component 3, D Planning and communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<ul style="list-style-type: none"> Students describe what a terminator is used for. <p>Introductory activity</p> <ul style="list-style-type: none"> Students draw a simple diagram of the technologies in the classroom. <p>Main session activities</p> <ul style="list-style-type: none"> Students work in pairs and choose three examples of systems diagrams to explore and interpret. Students write down the key information they can draw from the diagrams and share their interpretations with the class. <p>Plenary activity</p> <ul style="list-style-type: none"> Students explain what information system diagrams usually contain and describe how system diagrams help you understand a system. 	<p>Examples of system diagrams.</p> <p>Suitable software to draw systems diagrams. Alternatively, students may wish to do this on paper.</p>
44	<p>Tables and written information</p> <p>[Component 3, D Planning and communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students find a section of numerical data in a book or online and consider what techniques could be used to make the information clearer to the reader. <p>Main session activity</p> <ul style="list-style-type: none"> Students enter data into a spreadsheet. Number of hits on a contact us page: Jan – 8070, Feb – 6316, Mar – 7651, Apr – 9222, May – 8006, June – 7123. Students create a pie chart that shows the percentage of hits on this page in each month and which months have the highest and lowest numbers of hits. <p>Plenary activities</p> <ul style="list-style-type: none"> Students explain why tables and charts are useful and how written information can support charts, tables and 	<p>Data for students to create pie chart.</p> <p>Access to Excel/Google Sheets.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p>diagrams.</p> <ul style="list-style-type: none"> Students explain what an executive summary is. 	
45	<p>Creating data flow diagrams</p> <p>[Component 3, D Planning and communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students list the different shapes used for specific components within an organisation. <p>Main session activities</p> <ul style="list-style-type: none"> Provide students with a data flow diagram representing the following processes in a fancy dress hire shop: enquiries, sales, payments, dispatch, returns. Students review the diagram and examine the enquiry process that the entities and data stores are linked to, as well as the data flows. They then explain the diagram to a partner. Students work in pairs and draw a data flow diagram to represent this scenario in a doctor's surgery. <ul style="list-style-type: none"> A patient requests an appointment. The appointment availability is checked in an appointments diary. An appointment is offered to the patient. The appointment is confirmed in the diary. The patient is told the appointment has been made. <p>Plenary activity</p> <ul style="list-style-type: none"> Students examine each of the processes in one of the data flow diagrams studied during the lesson and write out how the processes are interacting with the other components they are linked to. 	<p>Examples of data flow diagrams. Search 'data flow diagrams' at https://www.lucidchart.com and find examples at https://www.visual-paradigm.com in the <i>Tutorials</i> section.</p>
46	<p>Creating flowcharts</p> <p>[Component 3, D Planning and</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> Students review the use of different shapes for specific components in flow charts. 	<p>Copies of flow chart.</p> <p>Copies of Moov2gether case study (as outlined in</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
	<p>communication in digital systems; D1 Forms of notation]</p> <p>Students could reflect on what they covered in Component 1, B1 Project planning techniques. Students should reflect on how the different forms of notation could have been used to investigate how organisations operate when creating a new system for them.</p>	<p>Main session activities</p> <ul style="list-style-type: none"> • Students review a flow chart and work with a partner to interpret the diagram. Students share their interpretation with the class. • Students draw a flow chart that explains the process of inputting and validating a card and displaying a balance on the screen of an ATM. • Students work in pairs and on the Moov2gether case study. • Case study: Moov2gether is trying to decide on a fee discount structure to encourage more customers. They are looking to give fee discounts. All commercial properties will attract a 10% fee discount. Residential properties over £200,000 will attract a 6.5% fee discount. Residential properties under £200,000 will attract a 2% discount. • Students draw a flow chart demonstrating this fee discount structure. <p>Plenary activities</p> <ul style="list-style-type: none"> • Students complete a flow chart from a scenario and share their solution. • Students explain how flowcharts can help you to understand the way a system works. 	<p>'Main session activities' column for this lesson) or teachers can create their own case studies if preferred.</p> <p>Example scenarios.</p>
47	<p>Component 3: assessment practice</p> <p>Preparation for assessment</p>	<p>Introductory activity</p> <ul style="list-style-type: none"> • Teacher talks the class through how they will be assessed in Component 3 as part of the synoptic assessment and answers any questions. • The teacher then tells students that they will be completing some practice questions from Section D of the specification. <p>Main session activity</p>	<p>Practice questions covering Section D of the specification.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> • The teacher should then give students practice questions and recap the meaning of each of the command words with students before they start. • Students complete a practice assessment activity, referring to their own notes from previous sessions. <p>Plenary activity</p> <ul style="list-style-type: none"> • Students should reflect on any questions that they found difficult and the possible reasons why. For example, students should consider if they struggled because of subject knowledge or not understanding the command word. 	
48	Component 3: assessment practice	Students should be prepared to take the external exam for this component. Centres are advised to consult the Sample Assessment Material (SAM) for further information about how the exam will be structured.	

Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this qualification. Check the Pearson website (<http://qualifications.pearson.com/endorsed-resources>) for more information as titles achieve endorsement.

Websites

<http://www.broadbanduk.org> – search for ‘Open Internet Code of Practice 2016’.

<https://creately.com/blog/> – search for ‘ultimate flowchart guide’. This website contains information about what a flow chart is, why it is used, the different flow chart symbols and how to construct flow charts.

<https://www.entrepreneur.com> – search for ‘10 Questions to Ask When Choosing a Cloud Provider’. This website provides useful information about what should be considered before choosing a cloud platform provider.

<https://www.gov.uk/government/policies/cyber-security> – this website contains the latest information about how the government is dealing with cybersecurity and information about majority security threats.

<https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/> – this website contains a guide to the GDPR and how organisations should comply with its requirements.

<https://www.lifewire.com> – search for ‘Pros and Cons of Cloud Computing’. This website provides a summary of the key benefits and drawbacks of cloud computing.

<https://www.rapid7.com> – search for ‘Types of Cybersecurity Attacks’. This website contains information about the different cybersecurity threats that organisations and individuals may experience including malware, phishing, SQL injections and denial-of-service (DOS) attacks.

<https://whatis.techtarget.com> – search for ‘Acceptable Use Policy (AUP)’. This information gives information about what an AUP is and the general areas that are included.

<https://www.useoftechnology.com> – search for ‘The impact of Technology on Our Lives Today’. This website provides information about the positive and negative impacts that IT has had on organisations, education, society, agriculture and banking.

<https://www.visual-paradigm.com> – search the *Tutorials* section for data flow diagram examples. This website contains useful information about what a data flow diagram is, what they are used for, the data flow diagram symbols and how to construct them.

<https://www.w3.org/WAI/> – this website provides information about the different needs that users may have and how technology can be adapted to meet these needs.

<https://en.wikipedia.org> – search for ‘Right to be forgotten’. This information gives information about the right to be forgotten concept that has been put into practice across the EU.

Textbooks

Burdett, A. et al., *BCS Glossary of Computing and ICT* (13th edition), BCS: The Chartered Institute for IT, 2013, ISBN 9781780171500 – this book contains definitions for key terms in the IT industry.

Amoroso, E. and Amoroso, M., *From CIA to APT: An Introduction to Cyber Security* (1st edition), 2017, ISBN 9781522074946 – this book contains an introduction to cybersecurity in a friendly manner and uses diagrams to illustrate points.

Wilson, J., *An Introduction to Cloud Computing* (Kindle edition), James Wilson, 2016 – this eBook provides an easy summary of the fundamentals and concepts of cloud technology.

Journals

Impacts of IT on Individuals, Organizations and Society (semanticscholar) – contains a variety of information about current impacts that IT has created.

Sample Acceptable Usage Policy (getsafeonline.org) – contains a sample acceptable use policy template.

Videos

Search YouTube for the following videos.

- ‘How to Draw Data Flow Diagram’ – a video giving a useful introduction to what the different Data Flow Diagram (DFD) symbols are and how to construct basic DFDs.
- ‘Introduction to Creating Flowcharts’ – a video giving a useful introduction to what the different flow chart symbols are and how to construct basic flow charts.
- ‘The Right To Be Forgotten’ – a video giving a general overview of the right to be forgotten concept.