Cambridge Assessment International Education

Scheme of Work

Cambridge IGCSE™ / Cambridge IGCSE (9–1)
Information and Communication Technology 0417 / 0983

For examination from 2023

Cambridge Pathway

Version 1

In order to help us develop the highest quality resources, we are undertaking a continuous programme of review; not only to measure the success of our resources but also to highlight areas for improvement and to identify new development needs.

We invite you to complete our survey by visiting the website below. Your comments on the quality and relevance of our resources are very important to us.

www.surveymonkey.co.uk/r/GL6ZNJB

Would you like to become a Cambridge consultant and help us develop support materials?

Please follow the link below to register your interest.

www.cambridgeinternational.org/cambridge-for/teachers/teacherconsultants/

Contents

Introduction

This scheme of work has been designed to support you in your teaching and lesson planning. Making full use of this scheme of work will help you to improve both your teaching and your learners' potential. It is important to have a scheme of work in place in order for you to guarantee that the syllabus is covered fully. You can choose what approach to take and you know the nature of your institution and the levels of ability of your learners. What follows is just one possible approach you could take and you should always check the syllabus for the content of your course.

Suggestions for independent study **(I)** and formative assessment **(F)** are also included. Opportunities for differentiation are indicated as **Extension activities**; there is the potential for differentiation by resource, grouping, expected level of outcome, and degree of support by teacher, throughout the scheme of work. Timings for activities and feedback are left to the judgement of the teacher, according to the level of the learners and size of the class. Length of time allocated to a task is another possible area for differentiation.

Guided learning hours

Guided learning hours give an indication of the amount of contact time you need to have with your learners to deliver a course. Our syllabuses are designed around 130 hours for Cambridge IGCSE courses. The number of hours may vary depending on local practice and your learners' previous experience of the subject. The table below give some guidance about how many hours we recommend you spend on each topic area.

Topic	Suggested teaching time (hours / % of the course)	Suggested teaching order
1: Types and components of computer systems	6 hours (5% of the course)	The units are designed to be taught in the order in which they are numbered. We recommend covering Units 1–5 first.
2: Input and output devices	4 hours (3% of the course)	
3: Storage devices and media	2 hours (2% of the course)	
4: Networks and the effects of using them	6 hours (5% of the course)	
5: The effects of using IT	5 hours (4% of the course)	
6: ICT applications	12 hours (8% of the course)	
7: The systems life cycle	10 hours (8% of the course)	
8: Safety and security	6 hours (5% of the course)	

Topic	Suggested teaching time (hours / % of the course)	Suggested teaching order
9: Audience	4 hours (3% of the course)	These units are more practical topics and can be studied on their own or together with other practical units.
10: Communication	4 hours (3% of the course)	
11: File management	4 hours (3% of the course)	
12: Images	4 hours (3% of the course)	
13: Layout and Document production	10 hours (8% of the course)	
14: Styles	4 hours (3% of the course)	
15: Proofing	4 hours (3% of the course)	
16: Graphs and charts	5 hours (4% of the course)	
17: Databases	12 hours (8% of the course)	
18: Presentations	8 hours (6% of the course)	
19: Spreadsheets	10 hours (8% of the course)	
20: Website authoring	10 hours (8% of the course)	

Resources

You can find the endorsed resources to support Cambridge IGCSE Information and Communication Technology on the Published resources tab of the syllabus page on our public website here.
Endorsed textbooks have been written to be closely aligned to the syllabus they support, and have been through a detailed quality assurance process. All textbooks endorsed by Cambridge International for this syllabus are the ideal resource to be used alongside this scheme of work as they cover each learning objective. The 0983 syllabus runs parallel to the 0417 syllabus content and assessment criteria. Cambridge IGCSE and Cambridge IGCSE (9–1) syllabuses are at the same level. In addition to reading the syllabus, teachers should refer to the updated specimen assessment materials.

Tools to support remote teaching and learning – Click here to find out about and explore the various online tools available for teachers and learners.

School Support Hub

The School Support Hub www.cambridgeinternational.org/support is a secure online resource bank and community forum for Cambridge teachers, where you can download specimen and past question papers, mark schemes and other teaching and learning resources. We also offer online and face-to-face training; details of forthcoming training opportunities are posted online. This scheme of work is available as PDF and an editable version in Microsoft Word format; both are available on the School Support Hub at www.cambridgeinternational.org/support. If you are unable to use Microsoft Word you can download Open Office free of charge from www.openoffice.org

Websites

This scheme of work includes website links providing direct access to internet resources. Cambridge Assessment International Education is not responsible for the accuracy or content of information contained in these sites. The inclusion of a link to an external website should not be understood to be an endorsement of that website or the site's owners (or their products/services).

The website pages referenced in this scheme of work were selected when the scheme of work was produced. Other aspects of the sites were not checked and only the particular resources are recommended.

How to get the most out of this scheme of work – integrating syllabus content, skills and teaching strategies

We have written this scheme of work for the Cambridge Information and Communication Technology 0417 / 0983 syllabus and it provides some ideas and suggestions of how to cover the content of the syllabus. We have designed the following features to help guide you through your course.

Learning objectives help your learners by making clear the knowledge they are trying to build. Pass these on to your learners by expressing them as 'We are learning to / about…'.

Suggested teaching activities give you lots of ideas about how you can present learners with new information without teacher talk or videos. Try more active methods which get your learners motivated and practising new skills.

Syllabus ref.	Learning objectives	Suggested teaching activities
4.1 Networks	Know and understand a router	Explain to learners the purpose of a router and how they operate. Ask learners to draw a diagram to demonstrate the operation of a router. Give learners a checklist of things their diagram should demonstrate to allow them to self-assess their diagram. Learners should compare their diagram to the checklist and make any improvements if they do not think their diagram meets one of the criteria on the checklist. **(F)** **Extension activity:** Challenge learners to find out how data is broken down into packets to be sent what each packet of data contains, including the header, payload and footer. **(I)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternati		

Extension activities provide your more able learners with further challenge beyond the basic content of the course. Innovation and independent learning are the basis of these activities.

Independent study (I) gives your learners the opportunity to develop their own ideas and understanding without direct input from you.

Formative assessment (F) is ongoing assessment which informs you about the progress of your learners. Don't forget to leave time to review what your learners have learnt – you could try question and answer, tests, quizzes, 'mind maps', or 'concept maps'. These kinds of activities can be found in the scheme of work.

Past papers, specimen papers and **mark schemes** are available for you to download at: **www.cambridgeinternational.org/support**

Using these resources with your learners allows you to check their progress and give them confidence and understanding.

1. Types and components of computer systems

Syllabus ref.	Learning objectives	Suggested teaching activities
1.1 Hardware and software	Know and understand hardware Know and understand software	Ask learners to think about the terms hardware and software and what they think they refer to. Provide learners with a range of images of computer hardware components (such as RAM, a keyboard, a CPU, a monitor, a graphics card, a motherboard) and a range of images of computer software (such as a word processor, a web browser, spreadsheet software). Ask learners to sort the images whether they think they are an example of hardware or software. **(F)** Ask learners to think about a definition for hardware and a definition for software. Ask learners to share their definitions with a partner. Ask each pair to discuss the definitions that they have thought of and to join their thoughts to improve their definition. Ask a selection of pairs to share their definitions. **(F)** Ask learners to looking at the link www.howstuffworks.com/inside-computer.htm and make a list of all the hardware that can be found inside a computer. **(I)** Discuss with learners that there are two main types of software: applications software and system software. Explain that applications software provides the services that the user requires to solve a task, and system software provides the services that the computer requires to operate. Call out several examples of software and ask learners to raise their right hand if they think it is an example of applications software and their left hand if they think it is an example of system software. **(F)**
1.1 Hardware and software	Know and understand analogue and digital data	Ask learners to think about how we, as humans, process data. Ask learners to think about how computers process data. Ask learners to share what they think is different about how humans process data and how computers process data. Discuss with learners why we do not process data in the same way and what the difference is between the analogue data processed by humans and the digital data processed by computers. Explain to learners that analogue data needs to be converted to digital data to be processed by a computer. Ask learners to draw a diagram that demonstrates the difference between analogue and digital data. **(F)**
1.2 The main components of computer systems	Know and understand the Central Processing Unit (CPU) Know and understand internal memory Know and understand	Explain to learners that most computers have common key components – these are a CPU, memory, input and output devices and backing storage. Explain the role of the CPU, memory and input and output devices. Show learners the video www.youtube.com/watch?v=DKGZlaPlVLY that gives them a real-life example of how the key components operate together. Provide learners with a list of devices and ask them to indicate whether the device is an example of an input device, an output device, memory or backing storage. **(F)**

Syllabus ref.	Learning objectives	Suggested teaching activities
	input and output devices Know and understand backing storage	Give learners a list of statements about the key components of a computing system, including some statements that are incorrect. The learners have to identify if the facts are true or false. **(F)** Ask learners to create a poster that can be displayed in their classroom to inform people about the role and characteristics of the key components of a computer system. Ask learners to get their poster reviewed by a peer. They should ask their peer for two things that they think are really good about their poster and one thing that could be improved about their poster. Ask learners to make improvements to their poster based on the feedback from their peer. **(F)** **Extension activity:** Challenge learners to find out the key components that are normally found within a CPU. Ask them to list three facts about how these components process data within the CPU. **(I)**
1.3 Operating systems	Know and understand operating systems	Using two simple tasks that can be done on a computer every day, e.g. opening a document and saving a document, explain to learners what an operating system is and what different characteristics each type of operating system has.. Compare carrying out these tasks on a GUI to carrying them out on a CLI. It would be best to use Windows for a GUI and the command line in Windows for CLI. If possible, demonstrate a similar task using a dialogue-based interface, such as Siri or Cortana. Give learners a worksheet outlining several different tasks that a user may want to complete. Ask learners to choose an operating system that would be suitable to use to complete that task and the benefits of using that operating system. **(F)** **Extension activity:** Ask learners to watch the video www.youtube.com/watch?v=26QPDBe-NB8 to find out how computers operated before operating systems existed and the history of the development of operating systems.
1.4 Types of computer	Know and understand desktop computers Know and understand mobile computers	Give learners a number of scenarios for different people. The scenarios should describe what tasks the person wants to complete and important information about what they do. Learners should recommend the most suitable device for them to use and the reason(s) why. Vary the scenarios to include office tasks, education tasks, gaming and entertainment. Learners should highlight the characteristics of the device that make it most suitable for the task when providing their reasons. **(F)**
1.5 Emerging technologies	Know and understand the impact of emerging technologies	Discuss with learners what is meant by Artificial Intelligence (AI). Ask learners to share examples of when they have encountered the use of Artificial Intelligence in their daily life. Ask learners how they feel about the use of Artificial Intelligence. Discuss with learners why some people have an issue with the use of Artificial Intelligence. Ask learners to use the internet to find two news stories that have information about the use or development of Artificial Intelligence. **(I)** Ask learners to write a report on the news stories about the impact of the two examples of Artificial Intelligence. **(F)**

Syllabus ref.	Learning objectives	Suggested teaching activities
		Before learners begin writing their report, discuss and agree success criteria with learners about what they should include in their report e.g. at least two benefits they feel the AI could provide. Before learners submit their report, ask them to review the success criteria to make sure they have included everything they need to in the report.
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

2. Input and output devices

Syllabus ref.	Learning objectives	Suggested teaching activities
2.1 Input devices and their uses 2.2 Direct data entry and associated devices 2.3 Output devices and their uses	Know and understand input devices Know and understand direct data entry Know and understand output devices	Give learners three different scenarios that will require users to complete tasks using a system that incorporates input devices, output devices and different elements of data entry e.g.: • A machine to purchase tickets at a train station • An information kiosk at a zoo • An interactive exhibit in a museum • A self-checkout system at a supermarket Ask learners to choose a range of suitable input devices, data entry methods and output devices for use in the system and give reasons for their choices, based on the devices' characteristics and advantages. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

3. Storage devices and media

Syllabus ref.	Learning objectives	Suggested teaching activities
3. Storage devices and media	Know and understand storage devices Know and understand storage media	Explain to learners that there are different types of storage devices and media. Discuss the advantages and disadvantages of each. Ask learners to write a guide for a beginner to help them choose a suitable storage device or media for a given task. Their guide should include the advantages and disadvantages of each storage device and media for common tasks such as storing large amounts of data, needing to transport data from device to device, needing to access data quickly etc. **(F)** Learners can use the link www.teach-ict.com/gcse_new/computer%20systems/storage_devices/miniweb/index.htm for further information about storage devices**.**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

4. Networks and the effects of using them

Syllabus ref.	Learning objectives	Suggested teaching activities
4.1 Networks	Know and understand a router	Explain to learners the purpose of a router and how they operate. Ask learners to draw a diagram to demonstrate the operation of a router. Give learners a checklist of things their diagram should demonstrate to allow them to self-assess their diagram. Learners should compare their diagram to the checklist and make any improvements if they do not think their diagram meets one of the criteria on the checklist. **(F)** **Extension activity:** Challenge learners to find out how data is broken down into packets to be sent using a router, and what each packet of data contains, including the header, payload and footer. **(I)**
4.1 Networks	Know and understand common network devices	Give learners a set of flash cards with network components and descriptions on them. Ask them to match the descriptions to the component. Ask learners to compare their matches to those of a partner. Ask them to discuss any differences they have and agree which answer they think is correct. **(F)** **Extension activity:** Challenge learners to draw a diagram of a network, incorporating as many of the network devices that they have learnt about as they can.
4.1 Networks	Know and understand wi-fi and Bluetooth	Ask learners to watch the following two videos **(I)**: How does wi-fi work? - www.youtube.com/watch?v=xmabFJUKMdg How does Bluetooth work? - www.youtube.com/watch?v=jzxZUJmOu3o Give learners a set of questions about the operation of wi-fi and Bluetooth and ask them to use the knowledge they learnt from watching the videos to answer the questions. **(F)**
4.1 Networks	Know and understand cloud computing	Explain to learners what is meant by cloud computing, including how data is stored in the cloud. Divide the learners in the classroom into two groups. Ask one group to research the benefits of storing data in the cloud. Ask one group to research the drawbacks of storing data in the cloud. Choose two learners to be mediators for the activity. The following videos and links may be helpful to learners: www.youtube.com/watch?v=7DgxjQ6Qd54 www.youtube.com/watch?v=M988_fsOSWo www.stratospherenetworks.com/advantages-and-disadvantages-of-cloud.html www.simplilearn.com/advantages-and-disadvantages-of-cloud-computing-article

Syllabus ref.	Learning objectives	Suggested teaching activities
		Ask learners to hold a debate about whether people should store data in the cloud. Each group should present their argument. The two learners that are mediators have to listen to the arguments of each side and at the end decide which group they think gave the strongest argument. **(I)**
4.1 Networks	Know and understand common network environments	Explain to learners what is meant by the internet, an intranet and an extranet. Tell learners that a new company is considering setting up an intranet and an extranet. Tell learners they work for a consultancy company and the new company want a report that outlines whether they should set up an intranet and an extranet. Learners decide whether or not they think this should be done and outline the reasons for their decision in their report. **(F)**
4.1 Networks	Know and understand network types	Give learners a table that compares a LAN network to a WAN network. The table should contain points of comparison that learners need to complete such as size, bandwidth etc. The table should have two columns, one for LAN and one for WAN. Learners should complete the table with the required information about each. **(F)** **Extension activity:** Ask learners to research what a personal area network (PAN) is.
4.2 Network issues and communication	Know and understand security issues regarding data transfer Know and understand passwords Know and understand other authentication methods	Explain to learners that data, especially personal data is very valuable. Due to its value and how it can be used, people will try to steal it and one of the ways this is attempted is when it is being transferred from one computer to another. Explain to learners that one simple method that can be used to keep data secure is a password. Explain that passwords do carry a risk though, especially if people use data in them that is easily guessed or discovered. Give learners a worksheet that has a range of students' names and the passwords they have set for their account. Create a mixture of good passwords and passwords that raise issues e.g. p4ssword, 1234 etc. Ask learners to comment on whether they think each password is a good, strong password and why, or whether it is a bad password and how it could be improved. **(F)** Ask learners to work in a group to create a short video that can be used to advise people how to choose a strong password and why this is important. **(F)** Explain to learners that there are other methods of authentication that can be used as a method of security, or to add an additional layer of security. Explain what these methods are. Ask learners to add to their video to advise people what other methods of authentication can be used as a security method. **(F)**
4.2 Network issues and communication	Know and understand anti-malware software	Ask learners to research how anti-virus and anti-malware software scans, recognises and removes a virus and malware from a device. **(I)**

Syllabus ref.	Learning objectives	Suggested teaching activities
		Ask learners to create an infographic that can inform people about how anti-virus software operates. Before learners create their infographic, discuss and agree success criteria with learners for the content and design of the infographic. **(F)**
4.2 Network issues and communication	Know and understand electronic conferencing	Explain to learners what hardware, software and network connection is required to set up a video-conference, an audio-conference and a web-conference. Give learners three different tasks that need to be completed by a business. Make each task more suitable for a different type of electronic conferencing. Ask learners to think about each task and choose whether the business should use a video-conference, audio-conference or web-conference for the tasks and the reasons for their choice. Once learners have chosen a suitable method of electronic conferencing for each task, they should share their choices and reasons with a partner. If they have chosen different methods for a task they should discuss these differences and come to a conclusion about which method would be best. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

5. The effects of using IT

Syllabus ref.	Learning objectives	Suggested teaching activities
5.1 Microprocesor-controlled devices	Know and understand the effects of using microprocessor-controlled devices	Ask learners to name 10 devices in their home that contain a microprocessor. **(I)** Pick out a few different devices that learners identify and ask them what tasks these devices would be able to perform without the microprocessor. Discuss with learners whether they think the addition of a microprocessor to the device enhances its use, or not.
5.2 Potential health problems related to the prolonged use of IT equipment	Know and understand health issues	Divide learners into groups. Ask groups to research what health problems can occur through the use of IT equipment. **(I)** Once groups have completed their research, ask them to pool their findings and create a class list of all the health issues. Ask groups to choose and agree to work on one or two of the health issues per group. Once each group has decided which health issue they want to cover, ask them to create an audio file that explains what the health issue is and any strategies that can be used to prevent the health issue. Explain to learners that the groups need to work together to join all their audio files to create a podcast about health problems that can occur when using IT equipment. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

6. ICT applications

Syllabus ref.	Learning objectives	Suggested teaching activities
6.1 Communication	Know and understand communication media Know and understand mobile communication	Discuss with learners the purposes of a range of communication applications and what features they have that help them fulfil their purpose. Give learners a list of statements about communication methods, and ask them to identify if they are true or false. **Extension activity:** Internet Telephony Service Providers (ITSP) offer digital telecommunication services based on Voice over Internet Protocol (VoIP). Learners research what applications are available and how they are used. **(I)**
6.2 Modelling applications	Know and understand computer modelling	Ask learners to consider the impact of not modelling the budget for an event such as a concert, on a spreadsheet. They should be raising issues such as not knowing what they should charge as a ticket price. Ask learners to consider the impact of not modelling the effect of possible events when constructing a new building. They should be raising issues such as not knowing what effects the weather or a natural disaster, such as an earthquake, may have on the building. Ask learners to consider the impact of not modelling emergency situations such as rolling out flood defences. They should be raising issues such as not knowing how long it will take to put in place certain defences or whether they will be effective.
6.3 Computer controlled systems	Know and understand computer controlled systems	Ask learners to watch the video www.youtube.com/watch?v=3XkL0qQ21Oo about robots and their use in various aspects of our lives. **(I)** After learners have watched the video, discuss what benefits they think computer controlled systems, such as robots, have created for our lives. Ask learners to discuss these benefits with a partner and choose which two they think are the most beneficial effects of computer controlled systems. Ask each pair to write one or both of their benefits on the board to see whether each pair has chosen similar or different benefits. **(F)** Discuss with learners what drawbacks could occur from the use of computer controlled systems compared to using humans. Ask learners to share whether they think the benefits outweigh the drawbacks in their personal opinion.
6.4 School management systems	Know and understand school management systems	Discuss with learners what content linked to them goes into a school management system and what that data is used for.

Syllabus ref.	Learning objectives	Suggested teaching activities
6.5 Booking systems	Know and understand online booking systems	Ask learners to try using an online booking system to the point of making a payment (there are a few that will ask for payment last). Ask learners to make a note of the features of the booking system that they come across. **(I)** Ask learners to share what features they found in the booking system, what they found easy to do, what they found difficult to do. Ask learners to think about making that same booking by calling up a ticket office. Ask them to share whether they prefer the online booking system, or whether they would prefer to call and make the booking. Ask learners to share the reasons for their choice.
6.6. Banking applications	Know and understand banking applications	Ask learners to produce a flowchart to illustrate how an ATM machine works. **(I)** Discuss with learners how banking was done before ATM machines, telephone banking and internet banking existed. Discuss issues such as how cash was withdrawn and how bills were paid.
6.7 Computers in medicine	Know and understand information systems in medicine Know and understand 3D printers	Explain to learners that all patient records used to be paper based and stored in filling cabinets in an office. Ask learners to think about a doctor in a hospital doing their daily visit to all the patients on their ward. Ask them to think about how this would be completed if all the patient records were paper based and stored in the office, in comparison to the patient records being digital and available to the doctor using a mobile device. Ask learners to research a news story about 3D printing in medicine. **(I)** Ask learners as a group to give a presentation about what they have discovered. **Extension activity:** Ask learners to research two other ways that computers are being used in medicine.
6.8 Expert systems	Know and understand expert systems	Ask learners to use an example of an expert system e.g. WebMD and ask them to identify how they think it is giving a diagnosis. **(I)** Ask learners to work with a partner and share how they think a diagnosis is given. Ask them to think about what elements an expert system would need to be able to give a diagnosis. Ask a range of pairs to share their thoughts and analyse these as a whole class. As a whole class, learners should come to an agreed set of elements that they think must be involved in an expert system. **(F)** Ask learners to watch the video www.youtube.com/watch?v=11nzrNkn9D8 to see how close they were to working out what is involved in an expert system.
6.9 Computers in the retail industry	Know and understand computers in the retail industry	Ask learners to draw a diagram that demonstrates how point of sale (POS) and electronic funds transfer at point of sale (EFTPOS) are used in the retail industry. **(F)** Ask learners to think about a scenario in which they need to purchase a product e.g. an outfit for their school prom, a new

Syllabus ref.	Learning objectives	Suggested teaching activities
	Know and understand internet shopping	television etc. Ask learners to think about going to a shop to buy the product, what advantages would there be? Ask learners to think about buying the product online, what advantages would there be? Ask learners to share whether they would prefer to shop instore or shop online.
6.10 Recognition systems	Know and understand recognition systems	Provide learners with three sets of cards: one has a list of recognition systems, one has descriptions of the systems and one has possible uses for the system. Ask learners to match the correct recognition system to its description and possible uses. Discuss the various advantages and disadvantages of each system. **(F)**
6.11 Satellite systems	Know and understand satellite systems	Learners research how car satellite navigation systems work (through Global Positioning Systems (GPS)). Why might they go wrong? (Cars going into rivers etc.) **(I)** **Extension activity:** Discuss a news story about a missing plane or boat, e.g. Malaysian missing plane in 2014. Ask learners to research this case and write a report on how it was tracked through GPS and other satellite data. More about GIS: www.esri.com/en-us/what-is-gis/overview Learners research the characteristics of satellite media communication systems. Ask learners to compare them to other forms of media communication such as terrestrial and cable TV, cell phones etc. Are these systems all separate?
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

7. The systems life cycle

Syllabus ref.	Learning objectives	Suggested teaching activities
7.1 Analysis	Know and understand analysis of the current system Know and understand how to record and analyse information about the current system Know and understand system specification	Explain to learners that the analysis stage of the system life cycle is to analyse the current system and to use this information to find out the requirements for the new system. Discuss with learners what types of information would need to be known about the current system and the new system. Some examples of what needs to be considered are at: www.teach-ict.com/as_a2_ict_new/ocr/A2_G063/331_systems_cycle/slc_stages/miniweb/pg8.htm With learners, look at each piece of information that would need to be known and discuss whether an observation, an interview, a questionnaire or analysing current documents would be the best way to find out that information. Design two suitable scenarios that can be used that involve a business requiring a new system e.g. a restaurant has a spreadsheet that they currently use to record all their bookings. They want a new computerised system to allow them to more easily record and keep track of all their bookings. Pair learners together and give each learner in the pair a business scenario. Tell learners they are the business owner in this situation. Discuss with learners what makes a good questionnaire question and a good interview question. Ask learners to develop a questionnaire and a set of interview questions that can be used to gather information from their partner about their partner's current system and new system requirements. **(F)** Once learners have created their questionnaire and interview questions, they should ask their partner to fill out the questionnaire and complete the interview with the partner. **(I)** When they have completed their questionnaire and interview, learners use this information to create a requirements specification. **(F)**
7.2 Design	Know and understand design	Discuss with learners what is involved in the design stage of the systems life cycle. Ask learners to design a data capture form and a report for their partner's system. They should consider the layout and formatting of the data capture form and report, as well as any validation that will need to be present. Once they have designed these, they should show them to their partner and ask their partner for feedback about the design. They should make improvements based upon the feedback and then show the design to their partner again for approval. **(F)**
7.3 Development	Know and understand testing	Discuss with learners what issues could arise with a system that hasn't been tested and why testing is so systematic and recorded. Ask learners how proof would be provided that the system works if testing was not carried out.

Syllabus ref.	Learning objectives	Suggested teaching activities
and testing		Ask learners to create a test plan that could be used to test their data capture form and report. **(F)** Information about the structure of a test plan is at: www.teach-ict.com/as_a2_ict_new/ocr/A2_G063/331_systems_cycle/slc_stages/miniweb/pg15.htm
7.4 Implementation	Know and understand system implementation	Give learners a description of three different systems in an organisation that need implementing, with some background information about the organisation. Ask learners to choose an appropriate method of implementation for each and justify their choice. **(F)** Ask learners to write an email to their partner outlining which method of implementation they suggest for their business scenario and the reasons for this suggestion. **(F)**
7.5 Documentation	Know and understand documentation	Gather some suitable examples of documentation for systems. Separate learners into groups. Give each group at least one example of a document e.g. a user guide. Ask each group to look through their example(s) and make notes on what kind of information they find and how it is represented in the document. Ask each group to give a short presentation about their findings. **(F)**
7.6 Evaluation	Know and understand how to evaluate a solution	Explain to learners that the aim of the evaluation stage is to find out whether the new system meets the requirements and whether it solves the problem outlined in the analysis stage. Discuss with learners what kind of tasks can be completed to find out the answer to the two aims above e.g. going through each one of the requirements listed in the requirements specification and looking at whether the new system does meet that requirement. Evidence on whether it does can often be found from looking at the testing evidence.
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

8. Safety and security

Syllabus ref.	Learning objectives	Suggested teaching activities
8.1 Physical safety	Know and understand safety issues	Ask learners to produce a poster for classroom display to warn other learners about the safety hazards that can arise when using ICT. **(I)** Look at the classroom code of conduct or rules, if they are available, and ask learners if any of the safety issues that they have included on their poster are identified in that.
8.2 eSafety	Know and understand data protection Know and understand personal data Know and understand eSafety	Explain to learners that they have discussed in an early topic that data is valuable and because of this, people will try to steal it. Explain that companies will also try to collect as much data as they can about people because it is also valuable to them. Discuss with learners about why personal data may be valuable to a company. As part of this discuss things like targeted advertising that learners may regularly see when using the internet. Discuss with learners what kind of regulations companies have to follow to protect personal data and ask learners to share what they think may happen if those regulations were not in place. Discuss with learners what kind of risks can be encountered when using the internet and how to recognise them. Ask learners to write a pledge of things they will do to make sure they keep safe when using the internet. They should sign and date their pledge. It should include points such as: 'I will only use trusted websites to download files', 'I will only view age-appropriate material on the internet'. **(F)** Learners can find out more information about eSafety here: www.thinkuknow.co.uk/
8.3 Security of data	Know and understand threats to data Know and understand protection of data	Give learners a set of cards that have three facts about each threat on them. They should look at the fact on card 1 first and see if they can guess which threat it is, then move onto card 2 and finally to card 3, before they check the threat card to see if they are correct. For example: Card 1 may say – This threat can corrupt data on your computer Card 2 may say – This can be downloaded onto your computer when you download a file from the internet Card 3 may say – A scan can be performed on your computer that will use a database to find and remove any of this type of threat. The threat card would be Virus. **(F)** Explain to learners the different methods of protection that can be put in place to protect data. Ask learners to suggest at least two suitable methods of protection for each of the threats from the previous activity. **(F)**

Past and specimen papers
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**

9. Audience

Syllabus ref.	Learning objectives	Suggested teaching activities
9.1 Audience appreciation	Know and understand audience appreciation	Divide learners into groups. Provide each group with one example of a publication e.g. a leaflet/booklet and one example of a website. Make sure the publication and the website are for two different types of audience. Ask learners to work in their group to analyse the publication and the website and decide the type of audience each is designed to target and pick out specific aspects that support their decision e.g. the type of font used, the style of the images used, the colour palette used, the tone of the text. Ask each group to give a short presentation to outline their findings. **(F)**
9.2 Copyright	Know and understand copyright	Discuss with learners what is meant by copyright. Ask learners to consider a scenario in which they have spent a lot of time creating an image or piece of art that they are really proud of. They put a picture of this on their social media. Days later they are looking at a website and they see a company selling a copy of their image/art, knowing that they are not getting any payment themselves for this. How do they feel about this? Do they think that the company stole their image/art, or do they think that because they put it up on the internet for everyone to see, that the company are allowed to do this? Ask learners will copyrighting their image/art prevent this from happening in the future?
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

10. Communication

Syllabus ref.	Learning objectives	Suggested teaching activities
10.1 Communication with other ICT users using email	Know and understand email	Ask learners to log on to their email client and complete the following tasks: • Set up an email group that contains at least three of their friends • Write a professional email that outlines what netiquette is and how their friends should follow this when using the internet • cc another friend into the email • bcc another friend into the email • Attach a document to the file that contains the links www.bbc.co.uk/webwise/guides/about-netiquette and www.verywellmind.com/ten-rules-of-netiquette-22285 so their friends can find out further information about netiquette. **(F)** **Extension activity:** Ask learners to research how to avoid getting on a spam list and produce a leaflet for their peers to help them avoid this. **(I)**
10.2 Effective use of the internet	Know and understand the internet	Give learners a worksheet that has the terms (Internet, WWW, Intranet, Extranet, Blog, Forum, Wiki, Social networking, ISP, URL, Hyperlink, Web browser) in boxes on one side and definitions on the other. Ask learners to draw a line to match the term to its correct definition. **(F)** Ask learners to create an infographic about how to use a search engine effectively and how to select reliable sources from the internet. **(F)** Ask learners to watch the following videos about internet protocols (NOTE: These do go beyond what learners need to understand for the syllabus, but may interest them): HTTP: www.youtube.com/watch?v=SzSXHv8RKdM HTTPS: www.youtube.com/watch?v=w0QbnxKRD0w FTP: www.youtube.com/watch?v=PeiXwNHEJo0 SSL: www.youtube.com/watch?v=rROgWTfA5qE
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

11. File management

Syllabus ref.	Learning objectives	Suggested teaching activities
11.1 Manage files effectively 11.2 Reduce file sizes for storage or transmission	Be able to manage files Know and understand file formats Be able to compress files Know and understand file compression	Explain to learners that files can have different formats and what is meant by a file format. Open a word document and type some text into it. Demonstrate to learners that the document can be saved in different formats e.g. .doc, .rtf, .txt and .pdf. Explain what is different about the document in those different formats and when they may be used. Explain that some file formats compress the data and what it means to compress data, including why it is done. Give learners a list of file formats and ask them to research what kind of data of is saved in those formats, whether the data is compressed in that format, and when they are used. **(I)** Create a task for learners that requires them to do the following: (1) Locate an image from a shared area. The image should be in one type of image format and called pic1. (2) Import the image into an image program and then compress the image and save it as a different file extension, appropriate for viewing the image in many different image programs. (3) Give the image a sensible name based on its contents. (4) Save the image back into a certain folder in a shared area. **(F)** **Extension activity:** Learners watch the following two videos for further information about file formats and file compression. File formats: www.youtube.com/watch?v=KN8YgJnShPM File compression: www.youtube.com/watch?v=OtDxDvCpPL4
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

12. Images

Syllabus ref.	Learning objectives	Suggested teaching activities
12. Images	Be able to place and edit an image	Giver learners a suitable image to edit. Ask learners to: • crop the image to include/remove certain content • rotate the image a certain amount • flip the image either horizontally or vertically • make the image brighter/dimmer • change the contrast of the image • add another element to the image on a different layer and move the element to the back/front • group the layers of the image • resize the image to a certain size • place the image with precision within a document. A suitable scenario for this kind of task may be to edit an image that would be a logo for a company, then to place the edited logo image within a document. **(F)**
12. Images	Know and understand file size reduction	Demonstrate to learners, using an image, how reducing the image resolution and colour depth can reduce the file size of an image.
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

13. Layout and Document production

Syllabus ref.	Learning objectives	Suggested teaching activities
13.1 Create or edit a document 17. Document production	Be able to create a new document or edit an existing document Be able to organise page layout Be able to format text Be able to find and replace text Be able to use navigation Know and understand pagination Know and understand gutter margin	Give learners a document with some paragraphs of text about a certain topic e.g. the solar system. Select two suitable images that learners can use and import into the document. Find a recent news article about the solar system or space and copy the text from this into a document. Ask learners to: • enter a new paragraph of text at the end of the document (give learners the paragraph of text to enter) • highlight the new paragraph and drag and drop it into a different place in the document • enter the text 'Document edited by: [learner's name]' at the start of the document • highlight the text with their name that has just been entered and cut it • paste the text with their name in at the end of the document • import the two images and place them in certain places within the document • wrap some text around the images in two different ways e.g. square and tight • set a page break at the end of the text and insert a new page at the end of the document • change the orientation of the new page to landscape • copy and paste the text from the news article document onto the landscape page • display the news article text in three columns with a set column width • set the line spacing of the text in the news article to 1.5 • set the heading of the news article to bold • add a hyperlink at the end of the document to a suitable website for further information about the solar system. **(F)** Choose a suitable word in the text for a find and replace task e.g. find all the instances of the word 'rotates' and replace them with 'spins'. **(F)** Explain to learners what page margins are and what a gutter margin is. Explain why a user may want to change the page margins or set a gutter margin. Ask learners to alter the page margin on their document to a suitable size e.g. 1.25 cm **(F)**
13.2 Tables 17. Document production	Be able to work with tables within documents Be able to format text	Ask learners to use their document from the previous task to edit again. Ask learners to: • insert a table with a specific number of rows and columns • merge the top row of cells and insert a suitable title for the table • centre align the title in the table • shade the cell containing the title in a suitable colour • add data to the table (provide learners with the data to add. it could be some statistics about the solar system) • horizontally left align one column in the table and fully justify another column in the table

Syllabus ref.	Learning objectives	Suggested teaching activities
		• vertically align all the cells in the middle • adjust the column width of each column to fit to the text. **(F)**
13.3 Headers and footers	Be able to use headers and footers appropriately within a range of software packages Know and understand the purpose of headers and footers	Ask learners to use their document from the previous task to edit again. Ask learners to: • add a header to the document that will display the date in the top right corner • add a footer to the document that will display the page number in the bottom centre of the document. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

14. Styles

Syllabus ref.	Learning objectives	Suggested teaching activities
14. Styles	Be able to create, edit and apply styles Know and understand corporate house style	Explain to learners what is meant by a house style and why they may be used by a business. Ask learners to use the document they edited in Unit 13 for this task. Give learners a house style for the document that includes the font style, font sizes, font colours, text enhancements (e.g. all titles must be bold), spacing and bullet point style. Ask learners to apply the house style to their document. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

15. Proofing

Syllabus ref.	Learning objectives	Suggested teaching activities
15.1 Software tools 15.2 Proofing techniques	Be able to reduce errors Know and understand spell check software Know and understand validation checks Be able to perform visual verification Be able to proofread Know and understand verification	Explain to learners that it is important to check for and correct errors in a document. Ask learners what they think the impact of not doing this may be for an individual and a business. Explain that both validation and verification can be used to check for errors. Explain how they do this and what methods can be used e.g. the different validation checks that can be used and what kind of errors they identify, and the different methods of verification that can be used and how the help identify and correct errors. Explain to users they probably use a very common method of error checking when they use word processing software, this is a spell checker. Discuss with learners how a spell checker detects errors and ask learners whether they think, in their experience, a spell checker is always correct in its error correction suggestions. Give learners a passage of text in a document that contains errors. Ask them to use a spell checker to find errors in the document and ask them to proofread the document to find errors. Then give learners a correct version of the text and ask them to perform a visual check of their document and the correct version to see if they are the same. A similar activity could be performed with a spreadsheet containing errors, where learners verify and proof data entry. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

16. Graphs and charts

Syllabus ref.	Learning objectives	Suggested teaching activities
16. Graphs and charts	Be able to create, label and edit a graph or chart	Provide learners with a set of sales figures for a computer company. The sales figures should show the sales of their best product over the last 12 months. Ask learners to: • copy the sales figures into a spreadsheet • format the sales figures to display a currency symbol and display to 1 decimal place • select a suitable graph/chart to represent the trend for sales for a sales report • add a second data series to the graph/chart to show last year's sales figures • extend the maximum values for each axis by a suitable amount e.g. 10% • fully label the graph with a main title and axis titles • add a legend to the graph. **(F)** The link www.teach-ict.com/gcse_new/spreadsheets/charting/home_charting.htm may be useful to learners in understanding graphs and charts.
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

17. Databases

Syllabus ref.	Learning objectives	Suggested teaching activities
18.1 Create a database structure	Be able to create an appropriate database structure Know and understand types of database Know and understand primary and foreign keys	Explain to learners that databases can be flat file or relational. Discuss with learners the advantages and disadvantages of each. Explain to learners that relational databases are created using primary and foreign keys, and demonstrate with a small database example how this is done. Create a csv file that contains a set of data that can be used to create a database e.g. details of all the students in the class, including their favourite subject. Make at least one field in the file suitable to be a Boolean field. Create a second csv file that contains a second, related set of data, that contains details about all subjects and who teaches them. Ask learners to: • import the data from the two csv files into two different tables in the database software • set an appropriate data type for each field in each table • set the Boolean field to be a checkbox. **(F)** Discuss with learners what would be a suitable primary key for each table and how that can be used to create a relationship between the two tables. Ask learners to create a suitable primary key for each table and create a relationship between the two tables. **(F)**
18.1 Create a database structure	Be able to create and use a data entry form Know and understand form design	Show learners a poor example and a good example of a data entry form. Ask learners which example they think is best and why. Ask learners to identify and share any problems or issues they see with either data entry form. **(F)** Ask learners to create a data entry form for each of the tables in their database. Once learners have created their data entry forms, they should ask a partner to test them and provide feedback on what was easy and what was more challenging about using them. **(F)**
18.2 Manipulate data	Be able to perform calculations Be able to sort data Be able to search and select data	Give learners several search criteria for their database. Start with simple searches that have a single criterion and build to more challenging searches that require multiple criteria and the selection of certain data. Make at least one search involve a calculation e.g. how many students a certain teacher teaches. Make at least one search require the use of Boolean operators e.g. AND, OR, NOT. Ask learners to sort at least one of the search results e.g. sort the search result into alphabetical order based on students' surnames. **(F)**

Syllabus ref.	Learning objectives	Suggested teaching activities
18.3 Present data	Be able to display data	Ask learners to choose two of the results from the searches they completed and produce a report for each. They should make sure their report: • has a title • has a label for each field in the report, including calculated fields • has a different layout for each report e.g. a tabular format and a columnar format • has a suitable header and footer • displays all the data in full • has a suitable display format set for any numeric fields e.g. 2 decimal places, or as a percentage. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

18. Presentations

Syllabus ref.	Learning objectives	Suggested teaching activities
19. Presentations	Be able to use a master slide	Create a text file that contains text about a suitable topic e.g. Healthy eating, Endangered animals, Seven wonders of the world. Share the text file with learners for use in their presentation. Discuss with learners the purpose of a master slide and ask them to suggest what kind of things would need to be defined in the master slide. Make a list of these on the board. The type of things they should be identifying are layout, font style for headings, font style for subheadings, font style for body text, bullet point style, background colour, automated elements e.g. slide numbering. Share the text file with learners and ask them to experiment with different formats for their presentation until they have made a choice for the format of all the things defined in the discussion task about what should appear on a master slide. **(I)** Once learners have decided the format for their presentation, ask them to create a master slide. **(F)** Choose three learners to present the choices they have made for their master slide and why they have formatted it in that way. Ask other learners to provide feedback on their designs then ask each learner to revisit their master slide and make improvements based on the review of the three master slides. **(F)**
19. Presentations	Be able to create a presentation Be able to edit a presentation	Ask learners to use the text file and their master slide format to create a presentation. Agree success criteria with learners before they begin their presentation e.g. the presentation should include: • between eight and ten slides • at least three images • at least one bulleted list • at least one graph or chart • a video clip (you may need to provide learners with this) • an audio clip (you may need to provide learners with this) • a suitable title for each slide • action buttons to navigate the presentation • a hyperlink to a suitable website • a maximum of two styles of slide transition • a maximum of two styles of animation • alternative text applied to at least one image • one slide that is hidden e.g. a slide describing how to use the presentation at the end. **(F)**

Syllabus ref.	Learning objectives	Suggested teaching activities
19. Presentations	Be able to output the presentation	Ask learners to set their presentation display for each slide to a suitable period of time and to loop when it reaches the end. **(F)** Ask learners to print the presentation in two different formats e.g. four slides to a page and as a handout. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

19. Spreadsheets

Syllabus ref.	Learning objectives	Suggested teaching activities
20.1 Create a data model	Be able to create and edit a spreadsheet model Know and understand formulae and functions Know and understand order of operations Know and understand cell referencing	Demonstrate to learners the difference between a formula and a function, and the difference between absolute cell referencing and relative cell referencing. Explain to learners the order in which mathematical operations are carried out in calculations. Give learners the basic structure of a spreadsheet with a suitable set of data e.g. sales figures for a company, a mortgage payment calculator, budget for an event. Ask learners to: • Insert a new row/cell and provide suitable data to be added to it. • Format the spreadsheet to merge cells, add and delete cells. • Insert at least three different formulae that use three different functions and the two different types of cell referencing e.g. A LOOKUP function to look up data, such as a product price or cost, a sum function to calculate a total cost, a counting function to count how many of a certain product, an IF function to apply a discount based on certain criteria. At least one of the formulae should require nested functions e.g. an IF function that has a nested LOOKUP function. • Use a range of arithmetic operators in their formulae. • Give a cell or a range of cells a name and use this in a formula. **(F)**
20.2 Manipulate data	Be able to sort data Be able to search and select data	Give learners two searching and sorting criteria for their data set. The first should sort the data based on a single criterion into ascending order. The second should sort the data based on two criteria e.g. sort the data based on sales figures from highest to lowest, search the data based for which product is over a certain price and has sold over a certain amount and sort from lowest to highest. **(F)**
20.3 Present data	Be able to adjust the display features Be able to format a spreadsheet Be able to set page layout	Ask learners to demonstrate to a partner how to display their spreadsheet showing the formulae so that they are all fully visible. **(F)** Give learners a brief for formatting their spreadsheet that specifies things such as: • which text should be set to bold • text that needs to be wrapped to fit within a certain column width • text and cells that need to be made a certain colour, including conditional formatting on the data • how numerical data should be formatted e.g. to 2 decimal places, with a certain currency symbol • which rows or columns should be hidden. **(F)** Ask learners to demonstrate to a partner how to set a print area for their spreadsheet to print an area of the data on a

Syllabus ref.	Learning objectives	Suggested teaching activities
		single page, with the gridlines present. **(F)**
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support **(F)**		

20. Website authoring

Syllabus ref.	Learning objectives	Suggested teaching activities
21.1 Web development layers 21.2 Create a web page	Know and understand the three web development layers Be able to use HTML in the content layer Know and understand the use of HTML in the content layer	Explain to learners that websites are normally created using three different layers of construction. Explain what the three layers are and what kind of data they contain. Ask learners to think about why a website is constructed using those three layers and not just a single layer. Ask learners to share with a partner why they think they are separated into layers ad discuss their thoughts. Select at least three pairs to share why they think a website is divided into layers and what the benefits of this may be. **(F)** Give learners a brief of a website to create e.g. a zoo needs a website to tell people about the kind of animals that can be seen at the zoo, daily activities at the zoo and what facilities are available. Ask learners to use the internet to research some text content and images that they can use in their website. **(I)** Explain to learners that they need to know what the behaviour layer of a website is for, but they will not be required to create this. They just need to know how to create the content layer and the presentation layer and how to apply the presentation layer to the content layer. Discuss and agree with learners a set of success criteria for the website e.g. their website must have: • at least five webpages e.g. three pages about the animals, one about the daily activities, one about the facilities and opening times • a navigation area to navigate to each page in the website • a table of data • an ordered or unordered list • a hyperlink to an external source that opens in a new window • a bookmark • at least one image, video clip and audio clip (you may need to provide the video and audio clip). **(F)** When a learner thinks they have completed their website, they should ask a partner to check it against the agreed success criteria to see if it has everything included that is required. The website www.w3schools.com/ may be helpful for learners for tutorials on web development.
21.3 Use stylesheets	Be able to use CSS in the presentation layer Know and understand	Explain to learners that the presentation layer can either be set as an inline attribute, or defined in a cascading stylesheet (CSS) and applied to the content of a web page. Demonstrate how formatting is done as an inline attribute and how it is defined and applied using a CSS. Explain the difference between a class and an attribute and how they are used to define presentation.

Syllabus ref.	Learning objectives	Suggested teaching activities
	the use of CSS in the presentation layer	Ask learners to think about and choose a style for the following things in their website: • headings • subheadings • main body text • background colour • table properties. Once they have decided the style they want for each of these, ask learners to create a CSS file to define the presentation layer of their website. Once they have created the CSS file, ask learners to create a link from their HTML file to the CSS file so it can be applied. **(F)** The website www.w3schools.com/ may be helpful for learners for tutorials on CSS development.
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