



WJEC GCSE Digital Technology

Unit 1: The digital world (Block 5: Securing data and systems)

This bundle may contain most if not, all of the following resources:

- Each lesson provided is for first-time teaching and they include the following components:
 - Starter activity – The starter is designed for knowledge retrieval, many people believe (including myself) that revision should start from the very first lesson. So, each lesson the starter activity will include questions from previous topics to improve memory recall.
 - Exam practise – As much as we would like students to be great at exams, they need considerable practise and guidance to master the art. Each lesson includes a ‘walk and talk’ style exam question that students can work through and self-assess using the mark scheme provided.
 - Concept map – A concept map provides students with an overview of the topic and establishing the relationship it has with other concepts taught throughout the course.
 - Keywords – Each lesson will include a set of key words students will come across throughout the lesson. The really important key terms will include a definition and meaning which they can refer back to throughout the lesson.
 - New information – New concept is introduced and, in most cases, a video is provided which students watch and then answer a set of questions based around it. This is designed to provide some in-class discussion before moving onto the main activity.
 - Activity – Each lesson will include at least one activity that allows students to be more independent and dig a little deeper into the new concept. All activity sheets include answers.
 - Self-checker tool – This is a useful AFL tool in which students can check their understanding. The lesson could include a multiple-choice quiz which was built in Microsoft Forms.
- AFL (Knowledge capture):
 - This document is very versatile. It can be used as a plenary at the end to check understanding, could be used as a homework to consolidate learning, a starter for retrieval practice or saved for some revision.
 - It includes a RAG rating for students to complete with some exam-style questions. The answers/mark scheme to these exam-style questions also been included.
- Review:
 - An accelerated writing activity to encourage students to go into more detail and demonstrate a deeper understanding of certain concepts. This could be converted into a bingo card and each box they complete they get a reward, works well with low ability students who need some extra motivation.
- Knowledge organisers
 - There are some question marks as to whether these really have an impact but I know a decent proportion of students find them useful so for me that’s a win. Most lessons will include a knowledge organiser that can be used as future revision. Completed copy and a blank version will be provided in case you wanted students to complete them.
- Workbooks
 - These are condensed versions of topics taught and act as a useful revision guide for students to complete in preparation for an exam.
 - It’s quite flexible and could easily be used for anyone who prefers to go down the ‘flipped learning’ approach.
 - It’s also good to set students who may be absent from lesson.
- End of block assessment
 - This is a short exam-style paper on the first block. It’s out of 40 marks and a mark scheme has been included.



Lesson breakdown

Lesson	Topic	Structure
1	Social engineering	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding the command words used. • In-class activities on slides 8-9 with supporting videos. • The lesson consists of one activity: <ul style="list-style-type: none"> ○ Activity 1 is about students understanding that the human it's often seen as the 'weak point' with regards to system security. But it will help them to differentiate between accidental damage and deliberate/malicious damage. ○ Activity 2 looks more into a common fraudulent technique known as phishing and it's important for students to understand what it is, how to identify a phishing email and the strategies that can be put in place to avoid becoming a victim for this sort of attack. The final part can be used as an extension if you wish, it get students to look at different types of phishing which is beyond the specification. ○ The remainder of this worksheet follows the same pattern, describing different social engineering techniques, how to identify and prevent them. • Self-checker tool <ul style="list-style-type: none"> ○ A quiz in Microsoft Forms have been provided. Teachers can create a duplicate copy so they can pass it on to students. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organisers <ul style="list-style-type: none"> ○ One organiser that covers social engineering techniques as part of the specification. • Revision workbook <ul style="list-style-type: none"> ○ Teacher copy with answers and blank student version provided.
2	Malware	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding of the command words used. • In-class activities on Slide 8 with supporting video contributing to the in-class discussions. It is good for an introduction to malware but the prevention strategies can become a little repetitive. • The lesson consists of three tasks. <ul style="list-style-type: none"> ○ Activity 1 focuses on understanding the difference between trojans, worms and viruses. Students will better understand how they work, how to spot a computer system that is infected by one and how to prevent them. ○ Activity 2 focuses on understanding the difference between adware, spyware and ransomware. Students will better understand how they work, how to spot a computer system that is infected by one and how to prevent them. ○ Activity 3 focuses on understanding the difference between bot and a rootkit. Students will better understand how they work, how to spot a computer system that is infected by one and how



		<p>to prevent them. In addition to this, students will understand how bots can be used in a positive or negative way.</p> <ul style="list-style-type: none"> • Self-checker tool <ul style="list-style-type: none"> ○ A quiz in Microsoft Forms have been provided. Teachers can create a duplicate copy so they can pass it on to students. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organisers <ul style="list-style-type: none"> ○ One organiser that covers different types of malware. • Knowledge capture <ul style="list-style-type: none"> ○ Three questions based on today's learning (answers provided).
3	Network threats	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding of the command words used. • In-class activities on Slides 8-11 and a video that will contribute to the discussion. • The lesson consists of four tasks: <ul style="list-style-type: none"> ○ Each activity will focus on a particular threat, how it works and how to prevent them. In most cases, a case study is attached for the students to read and answer some questions around it. It gives them some context to how these threats can have an impact on the real world. It's up to you if you want to use the last worksheet, it's on SQL injection and that is not been made explicit on the specification. • Self-checker tool <ul style="list-style-type: none"> ○ A quiz in Microsoft Forms have been provided. Teachers can create a duplicate copy so they can pass it on to students. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organisers <ul style="list-style-type: none"> ○ One organiser that covers different types of network threats. • Knowledge capture <ul style="list-style-type: none"> ○ Three questions based on today's learning (answers provided).
4	Cyber resilience	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding the command words used. • In-class activities on Slides 9 to 13 with supporting videos. • This lesson consists of one task: • Activity 1: <ul style="list-style-type: none"> ○ Task 1: This is a good task because it allows students to draw on their prior knowledge from previous topics such as: anti-malware software and encryption as well other prevention strategies that have been discussed in DT21, DT22 and DT23. ○ Task 2: Another opportunity for students to draw on previous knowledge. They need to have a good understanding as to why backing up data is a good strategy. So, it requires them to have a good understanding of a disaster recovery plan and why organisations put these in place aswell as different backup strategies – would any be suitable to use in case of a cyber-attack?



		<ul style="list-style-type: none"> ○ Task 3: This focuses on the physical security aspect and looking at how organisations can keep their data secure from physical threats rather than digital. • Self-checker tool <ul style="list-style-type: none"> ○ A quiz in Microsoft Forms have been provided. Teachers can create a duplicate copy so they can pass it on to students. ○ This same quiz has been repeated for the next two lessons which is good for repetition. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organisers <ul style="list-style-type: none"> ○ One organiser provided. • Revision workbook <ul style="list-style-type: none"> ○ Teacher copy with answers and blank student version provided.
5	Digital footprint	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding of the command words used. • In-class activity on slide 8. • The lesson consists of one task. <ul style="list-style-type: none"> ○ Activity 1 – Identify what is meant by digital footprint, how it's created and how it can be reduced. The final task, students are presented with an opportunity to differentiate between a passive and active footprint. ○ Activity 2- This is all about understanding how our digital footprint can impact us on a much wider scale. A case study has been provided to make students aware of the impact a negative digital footprint can have on their future. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organiser <ul style="list-style-type: none"> ○ Small topic so it's been added to a future knowledge organiser. (In DT28 folder) • Knowledge capture <ul style="list-style-type: none"> ○ Three questions based on today's learning (answers provided).
6	GDPR	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding of the command words used. • In-class activities on Slide 8. • The lesson consists of one task <ul style="list-style-type: none"> ○ Activity 1: For each piece of legislation students should understand what I call the 3 P's: Purpose, Principles and Punishment. ○ Activity 2: Focuses on a particular case study where there was a data breach. Students read the case study, answer questions on it and provide advice on how to follow GDPR guidelines. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge capture <ul style="list-style-type: none"> ○ Three questions based on today's learning (answers provided).



7	Computer Misuse Act	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding the command words used. • In-class activities on Slide 8 • The lesson consists of one task <ul style="list-style-type: none"> ○ Activity 1: For each piece of legislation students should understand what I call the 3 P's: Purpose, Principles and Punishment. The final part provides students with scenarios in which they need to identify which section of the Computer Misuse Act is being breached. There is no requirement for this, but it gives them some context and the ability to refer back to previous topics on social engineering, malware and network threats. ○ Activity 2: Focuses on a particular case study where there was a data breach. Students read the case study, answer questions on it. • Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organisers <ul style="list-style-type: none"> ○ One organiser provided and this could be expanded as cloud services are discussed further down the specification. For example, it could lead to the addition of scalability. (e.g. vertical and horizontal scaling) • Revision workbook <ul style="list-style-type: none"> ○ This will be added to a future workbook when more content on cloud computing has been covered.
8	Investigatory Powers Act	<ul style="list-style-type: none"> • Starter activity on retrieval practice. • Students practise an exam-style question based on last week's learning. The mark scheme has been provided with some guidance on better understanding the command words used. • In-class activities on Slide 8 • The lesson consists of one task <ul style="list-style-type: none"> ○ Activity 1: Students will understand how the data we divulge is transmitted, tracked and stored. It will get them to think about how difficult it is to keep our data private. ○ Activity 2: Students will look at the impact technology has on individual privacy and wider society with particular focus on facial recognition technology where students look at the positives and negatives of utilising (e.g. use of facial recognition in public places) ○ Activity 3: Focuses on a particular case study where there was a data breach. Students read the case study, answer questions on it. • Self-checker tool <ul style="list-style-type: none"> ○ Knowledge capture acts as a skills audit in which students can check their level of understanding and test it against exam-style questions. • Knowledge organisers <ul style="list-style-type: none"> ○ One organiser that covers all pieces of legislation in the specification. • Revision workbook



This will be added to a future workbook when more content on cloud computing has been covered.

Resources

Exam starter

Exam prep!

The revision starts here!!

Look at the bitmap image (shown right)



State what is meant by the following terms:

a) The size of an image.

.....

b) The resolution of an image.

.....

State means to...

Give a specific name, value or other brief answer without explanation or calculation.

In this question, you get one mark for stating what is meant by the size of an image and one for resolution.

Use your answer slip from the booklet provided to write your answer.

[2]

Exam prep! – Mark scheme (including model answer)

The revision starts here!!

Look at the bitmap image (shown right)



State what is meant by the following terms:

a) The size of an image.

This refers to the height and width of the image which is measured in pixels.

b) The resolution of an image.

This refers to the number of pixels that can be stored per inch for example.

[2]

Size of an image:

- The height and width. ✓
- The height and width in pixels.

Resolution:

- Number of pixels per unit area of the display (per inch) ✓

Knowledge retrieval starter

Knowledge retrieval

How many points can you score?

Question	Points	Answer
What is a bitmap image made up of?	3	
What is meant by resolution?	3	
What is a vector graphic made up of?	3	
Name two types of compression.	3	
What data is in the form of sound waves?	2	
What process is used to record analogue sound at regular intervals so it can be converted to digital?	2	
What format is digital data?	2	
Name two types of primary storage	1	
What type of storage is used to store files for long-term use?	1	
What term is used to describe data that is lost when the computer is switched off?	1	

Knowledge retrieval

How many points can you score?

Question	Points	Answer
What is a bitmap image made up of?	3	Pixel
What is meant by resolution?	3	Number of pixels stored per inch
What is a vector graphic made up of?	3	Lines and curves
Name two types of compression.	3	Lossy and Lossless
What data is in the form of sound waves?	2	Analogue
What process is used to record analogue sound at regular intervals so it can be converted to digital?	2	Sampling
What format is digital data?	2	Digital
Name two types of primary storage	1	RAM and ROM
What type of storage is used to store files for long-term use?	1	Secondary Storage
What term is used to describe data that is lost when the computer is switched off?	1	Volatile memory/data

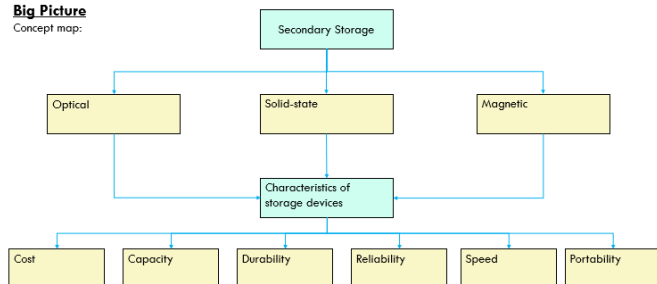
Concept map

Keywords



Big Picture

Concept map:



Key terms

Important terms:

- Storage
- Optical
- Laser
- Characteristics

Key words

Secondary storage	A type of non-volatile storage that allows data to be stored for long-term/late use.
Cost	How expensive per byte does it cost for the device?
Capacity	The amount of space available on the storage device.
Portability	How easy it is to transport from one place to another.
Durability	How resistant it is to external factors such as being dropped, scratched and how it responds to being in extreme conditions.
Speed	How quickly the data can be read and transferred from the storage device.
Reliability	This refers to longevity – how well does it maintain performance over time?

New information

Magnetic storage



Magnetic storage has been one of the most reliable types of storage for decades, starting off as magnetic tapes up to hard drives.

Question:

- How does magnetic storage work?
- Identify some pros and cons of using magnetic storage.

Answer:

- It consists of spinning magnetic platters on which data is stored a tiny head at the end of an actuator arm moves about to read and write data to different areas of the disk.
- Pros:** Cost per GB is low which gives you value for money. **Cons:** Speed: It also consumes a fair amount of power and is not always as fast as you would like. **Durability:** the platter and mechanical mechanisms are also somewhat fragile and easily damaged

Video

[Click here](#)

Activity

Activity 3

Below is a 3-bit bitmap image.

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0
0	0	0	0	0	0	0	0	0	4	3	3	2	1	0	0
0	0	0	0	0	0	0	0	4	4	5	4	3	2	1	0
0	0	0	0	0	0	4	4	4	4	4	3	2	1	0	0
0	0	0	0	0	4	4	4	5	4	4	3	2	1	0	0
0	0	0	0	4	4	4	4	4	4	4	3	2	1	0	0
0	0	4	4	5	4	4	4	4	4	3	2	1	0	0	0
0	2	3	3	4	4	4	4	3	3	2	1	1	0	0	0
0	1	2	3	3	3	3	3	2	1	1	0	0	0	0	0
0	0	1	2	2	2	2	2	2	1	1	0	0	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Key:

0		000
1	Green	001
2	Light Green	
3	Light Blue	
4	Red	
5	Black	
6	Blue	
7	Yellow	

Self-checker tool

Questions

Responses

DT2 - Sound (7 Points)

1. Enter your first name and surname *

Enter your answer

2. What term is used to describe sound waves? * (1 Point)

End of block assessment

Candidate name	Centre number	Candidate number

GCSE DIGITAL TECHNOLOGY
UNIT 1 THE DIGITAL WORLD
BLOCK 1: DATA
45 Minutes

INSTRUCTIONS FOR CANDIDATES

Answer ALL questions.

This paper consists of three sections: Section A: Images, Section B: Sound and Section C: Measuring and storing data

Knowledge organiser

DT5: Secondary Storage Definition/Meaning: Secondary storage has the ability to store files even when the computer is switched off. Therefore, it's a non-volatile form of storage.		Magnetic Storage Description The most common example of magnetic storage is a Hard Drive . The hard drive contains a number of moving mechanical parts such as a spinning platter with a thin magnetic coating. A "head" moves over the platter, writing 0's and 1's on the platter.		Revision tip: A common misconception is that secondary storage backs up data. If a duplicate copy is created then the device used to back it up would be classed as tertiary storage.
Review		Key terms:		
Cost Expensive from the outset, but cost per MB represents value for money.	Capacity Enough capacity to store different types of files. You can buy hard drives that can hold 4TB of data.	Reliability Can perform well for a long period of time but performance will eventually deteriorate.	Cost How much the device costs per MB.	
Durability If it's external then it can become damaged if dropped because it has moving parts.	Portability Would have to be detached from the computer and it's heavy.	Speed Uses a head that moves over a platter to read and write data so it's not instant.	Capacity How much space is available on the storage device.	
			Reliability Longevity – how well it can maintain the same level of performance over time.	
			Durability How resistant it is to external factors such as being dropped, scratched and how it responds to being in extreme conditions.	
			Portability How easy it is to transport from one place to another.	
			Speed How quickly the data can be read and transferred from the storage device.	

Revision workbook

Optical storage

Key Questions:
 Use the bars below to rank optical storage against the different storage characteristics. You must justify your answer.

10 = Good 1 = Bad



Capacity:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Justification

In comparison to other types of storage, the capacity isn't enough store a range of files. Although Blu-ray can store up to 50GB, it's still far less than what a USB flash drive can store.

Cost

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Justification

Although the capacity of these devices is relatively low, the cost per GB gives you excellent value for money. It can cost less than £1 for one blank 25GB Blu-ray disc.

Knowledge capture

Knowledge capture



WJEC Digital Technology
DT3: Knowledge Capture



Specification points:

1.1b Measuring and storing data

- be able to describe the relationship between binary data storage units

Skills audit:

Criteria			
I can order digital units of data from smallest to largest			
I can convert from one digital unit to another.			
I can identify primary, secondary and tertiary storage devices.			

Teacher feedback:

WJEC Digital Technology
DT3: Knowledge Capture



Exam-style questions

1. Emily is creating a film for a school project using a digital video camera and will transfer the videos to a computer for editing.

The computer 2GB of storage free.

Calculate the number of videos that could be stored on the computer if each video was 200MB in size. You must show your working.

.....

.....

2. A file size has a size of 72,000,000,000 bits.

[2]

Calculate the file size in megabytes and gigabytes. You must show your working.

Megabytes:

.....