

FOLLOWING THE CCEA SPECIFICATION

GCSE DIGITAL TECHNOLOGY

UNIT 1 SAMPLE PACK



PRODUCT SAMPLE

Benefits of purchasing product packs from GO2Educate:

Affordable, classroom ready and user-friendly starter-packs

Saving teachers' endless hours of preparation

Presentation is editable so it can easily be updated over the course of the specification

Resources can be used electronically within the school network by teachers and pupils in your school

Booklets can be printed and distributed to pupils in sections or as one complete resource

Pupil notes are kept in order for quick reference and revision

Release date: October 2017

THE SAMPLE CONTAINS:

- A full summary of what is included in the pack AND a snapshot of the layout and content in student booklets, teacher booklets and PowerPoint

THE FINAL PRODUCT INCLUDES:

√ Complete Student Booklets for Unit 1: INCLUDES 85 A4 PAGES

- Key facts and definitions
- Theory lesson activities
- Practical interactive activities
- Useful links

√ Complete Teacher Booklet for Unit 1

- Suggested lesson structure for each key topic
- Useful website hyperlinks - Starters and Plenaries

√ Teacher Editable PowerPoints for Unit 1: INCLUDES 129 SLIDES

- Learning intentions - Key facts and definitions - Starter activities
- Teacher answers to classroom activities (exception open ended and research tasks)

Teaching and Learning material is designed to be flexible and ready for use in the classroom. However, it should be noted that resources are created to be adaptable for a number of reasons. It is expected that different schools have different timetable allocations for student groups, courses evolve over time and teachers teach a wide range of abilities with specific needs. Therefore, the teaching and learning material should be considered as a basic starter pack designed to follow the content of the specification.



GO2 EDUCATE

FOLLOWING THE CCEA GCSE SPECIFICATION

DIGITAL TECHNOLOGY UNIT 1 Theory



STUDENT WORKBOOK SEPTEMBER 2017

Student Name: _____

Registration Class: _____

Teacher: _____

SITE LICENCE

Name of School:

TOPIC TRACKER

Content	Learning Outcomes	Tick/Date as topics are completed
Digital Data	<u>Students should be able to:</u>	
Representing Data	Describe the difference between information and data	
	Describe how data is stored in the following units: bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte	
	Identify the following data types: numeric (integer and real), date/time, character and string	
Representing Images	Demonstrate understanding of how pixels are used in image representation	
	Demonstrate understanding of how image resolution affects file size	
	Describe how vector-based graphics and bitmap graphics are stored	
	Describe the difference between vector-based and bitmap graphics	
	Demonstrate understanding of how buffering and streaming are used to support the transfer of moving image files	
Representing Sound	Describe factors that affect sound quality, including sample rate, bit depth and bit rate when recording sound	
	Explain the need for analogue to digital conversion in sound recording	
Portability	Demonstrate understanding of data portability and the following file formats that support it: jpeg, tiff, png, pict, gif, txt, csv, rtf, mp3, mp4, midi, mpeg, avi, pdf, wav and wmv	
	Demonstrate understanding of the need for data compression	

Etc.

REPRESENTING DATA: Data and Information

KEY FACTS

Raw data is a string of meaningless information that has not been given a context.

For example: 1643 or Blue car or 75%

Information is data that has been given a context and is meaningful.

For example: There are 1643 pupils in a school. The blue car is parked illegally. John attained 75% in his Digital Technology Examination.

STUDENT ACTIVITY

For each of the following descriptions in No 1 to 6, identify whether it is DATA OR INFORMATION. For No 7 & 8, ADD YOUR OWN EXAMPLES



1. Mr Parker	
2. Club Membership Number 054	
3. The sky is blue today	
4. JC4685432	
5. Yellow, Green and Blue	
6. 13:10, Monday 1 st October	
7.	
8.	

REPRESENTING DATA: Data and Information

A BUSINESS USES INFORMATION TO:

- Identify what resources they currently have available, so they can plan for the future
- Research and analyse market trends in the industry, so they can be competitive
- Record and monitor financial plans
- Monitor their performance against expected plans
- Make decisions on how they should best use their resources

STUDENT ACTIVITY

Joe owns a bakery. He has recorded the following statistical data. As his manager, you have been asked to transform the data into meaningful information. You should consider: What does the data tells you? How can this information be used to make decisions about resources e.g. staff, raw material orders, production?

Day of the week	Bread Units Sold	Sausage Rolls Units Sold	Cake Units Sold
Monday	30	100	50
Tuesday	20	50	50
Wednesday	20	30	30
Thursday	30	50	30
Friday	60	100	80
Saturday	50	150	60
Sunday	CLOSED	CLOSED	CLOSED



Transform the data into meaningful information here:	Explain how Joe can use the information to make decisions



REPRESENTING SOUND

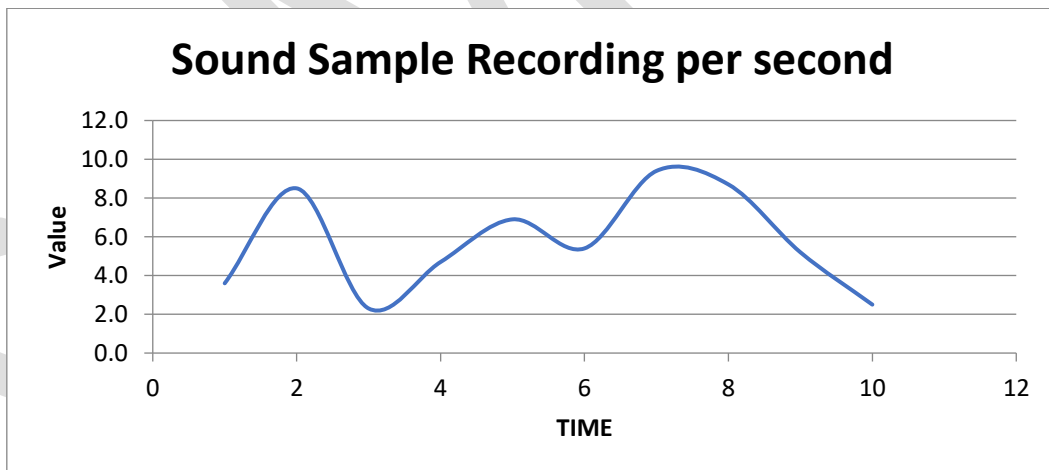
KEY FACTS

Sound is a type of wave that is made up of continuous vibrations i.e. small waves of pressure in the air, detected by the human ear and processed by our brain. However, our love for music and film means that we require a way of record sound to be able to play it over and over again.

Sound is usually recorded through a microphone diaphragm, for example, available on an audio recorder or a mobile phone. The microphone diaphragm detects changes in atmospheric pressure caused by acoustic sound waves.

We used to record sound as analogue on a digital cassette tape, however, there were often imperfections of crackling and background noise when it was played back. As we use digital devices today sound must be converted from an analogue to a digital sound using binary for computers to be able to process it. An analogue to digital converter is required for this job. This works by sampling the sound waves at regular time intervals. The more frequently the samples are taken, the more accurate and better quality the

The following graph visually represents a sound wave shown at regular time intervals per second



Samples are recorded to the nearest whole number and then converted to binary. To complete the next task you will need to know some of the basic denary (decimal) to binary conversions. See the table below:

1	2	3	4	5	6	7	8	9	10
0001	0010	0011	0100	0101	0110	0111	1000	1001	1010

Can you see the pattern?

STUDENT ACTIVITY 1

Plot the information on the graph on page 19 to the nearest whole number in denary (decimal) and then convert the data into binary.

Time Sample	1	2	3	4	5	6	7	8	9	10
Denary	4	8								
Binary	0100	1000								

STUDENT ACTIVITY 2

Now plot the sampled data into a new graph using the gridlines below as a guide **and** create a new, digital representation of the sound wave. Remember to give it a title and

Now compare your new graph to the one of page 19 and comment on the following:

How does it compare?

What are the key reasons for this?



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FOLLOWING THE CCEA SPECIFICATION

GCSE DIGITAL TECHNOLOGY Unit 1



Empowering the next generation with essential digital knowledge and skills



TEACHER BOOKLET

SEPTEMBER 2017

Teacher's Name: _____

SITE LICENCE

Name of School:

DATA AND INFORMATION

Topic	Starter Activity	Lesson Activities	Plenary Activity
Describe the difference between data and information	<p>Data or Information</p> <p>Show class a set of statements (one by one). Pupils have to guess whether it represents data or information.</p>	<p>Student Booklet</p> <p>Pages 5 to 6</p> <p>Identify whether the statement is Data OR Information</p> <p>Joe's Bakery Scenario Data, Information & Knowledge</p>	<p>Tweet Exit</p> <p>Students to compose a tweet (no longer than 160 characters) stating a definition and example for data and information. Stick it on the tweet board to exit to the classroom.</p>
Describe how data is stored in the following units: bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte	<p>Units in Order Labels</p> <p>Split class into groups of 7 and give each group 7 individual cards representing bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte. Ask each group to get into a straight line in order from smallest to biggest. Any overflow pupils can be allocated to the group as the managers in charge of the groups.</p>	<p>Student Booklet</p> <p>Pages 7 to 8</p> <p>Identify what units the electronic files are most likely to be measured in</p> <p>Research and identify storage capacity of storage facilities</p> <p>Draw in order of size</p>	<p>Class Spot Check</p> <p>How many bits in a nibble? How many nibbles in a byte? How many bytes in a kilobyte? How many kilobytes in a megabyte? How many megabytes in a gigabyte? How many gigabytes in a terabyte?</p>
Identify the following data types: numeric (integer and real), date/time, character and string	<p>Data Types</p> <p>PowerPoint</p> <p>Show class a set of statements (one by one). Pupils have to guess which data type should be allocated.</p>	<p>Student Booklet</p> <p>Pages 9 to 10</p> <p>Identify suitable data types</p> <p>Enter data into a spreadsheet and format to suitable data types</p> <p>Formatting checkpoint</p>	<p>Data Exit</p> <p>As each pupil leaves the room, they are to name one data type and state their own example.</p>

DATA AND INFORMATION WEBLINKS

<https://www.youtube.com/watch?v=bitUrAmXTnI>

<https://www.youtube.com/watch?v=l4sPBKmyWY4>

Etc.

EXAMPLE POWERPOINT SLIDES



GCSE DIGITAL TECHNOLOGY UNIT 1



Data Types

Telephone must be text so the 0 shows in the number. It is not used for calculations and is therefore a string.

Currency


1	2	3	4	5	6	7	8	9	10
YOUTH CLUB MEMBERS									
3	Surname	First Name	1st Line of Address	Town	Postcode	Telephone Number	Date of Birth	Group Number	Voluntary Contributions
4	Bryd	Bill	26 Lyons Way	Ashtrim	BT41 6H1	2894578943	24/06/2000	2	15
5	Hanson	Johanne	14 Peoples Lane	Ballymena	BT41 7TU	2894476342	12/10/1999	2	25
6	Walker	David	23 River Park	Crumlin	BT41 2D1	2894475843	14/01/2005	1	10
7	Miller	Jane	36 Tims Avenue	Ashtrim	BT41 6Y1	2894458893	10/03/2008	1	30
8	Young	Fiona	23 Styles Way	Magherafelt	BT41 6EU	2894458945	05/08/2001	2	20

Text Date/Time Number

Pixels - Colour Images

In reality most images today are in colour. The number of bits represents how many colours are available for each pixel. A 2-bit will give us 2 squared i.e. 4 more colours to use. For example we could say:



- 00 – Green
- 01 – Red
- 10 – Black
- 11 – Grey



In Summary the number of colours available depends on the number of bits per pixel.

Can you spot the key differences between the 2 images?

Vector Image Bitmap Image

Can you guess the file extension?

- Large raster file referred to as a bitmap image
 - Made up of tiny pixels
 - Formatting maintained across devices
 - Can be compressed to reduce file size
 - Does not lose its quality
- File format used for compressing audio
 - Relatively small file size, but retains quality
 - Most popular for downloading music
- Originally designed for streaming
 - Smallest video files over the web
 - Small file size also decreases the quality
- Developed by Adobe, viewable using Acrobat Reader
 - Can be created from a range of files e.g. Word PDF smaller than original file
 - Transferrable onto most systems

Modes of Processing

BATCH PROCESSING	ADVANTAGES	DISADVANTAGES
Examples: Stock Control System Weekly Payroll Monthly Phone Bill Quarterly Electricity Bill	Less expensive than online processing Once set up, processes can be easily repeated Batch Processing can run overnight Scheduled Batch Processes can be fully automated Batch Processing works well for high volume data	Input data must be fully complete before running the next batch Data errors or computer crashes can halt the process
REAL TIME PROCESSING	ADVANTAGES	DISADVANTAGES
Examples: Online Booking Facilities and E-Commerce e.g. cinema tickets, flight, hotel, football match	Easy access anywhere anytime via any device Databases are updated in real time Stock managed more easily Number of errors reduced	Expensive to set up Real time processing systems are more complex System failure may be costly to the organisation Regular backups are required
MULTI-TASK PROCESSING	ADVANTAGES	DISADVANTAGES
Examples: Management Information System e.g. SIMS Database, Online Games	Allows multiple users to access and edit data at the same time Allows multiple programs and processes to run at the same time Tasks can be connected to other tasks or completely unrelated Can switch between windows simultaneously Processes are so quick the user is unaware	Can be expensive to set up Time consuming to implement and update