Year 6 – Big Data 1 - Knowledge Organiser
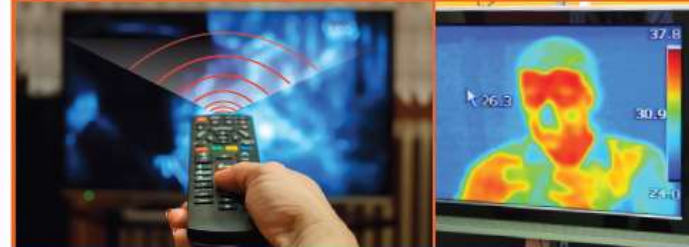
Big Data 1

Barcode	A machine-readable code of lines and numbers, printed on an item and scanned to identify the item and information about it.
Boolean	A form of data, which consists of (true) 1s and (false) 0s values.
Brand	The mark or logo that identifies the object as belonging to a particular establishment or person.
Commuter	Someone who travels between places on a frequent basis, for example between work and home.
Contactless	Devices or codes that can be read wirelessly or without the need to touch surface-to-surface, object-to-object.
Data	Information used for a specific purpose or investigation.
Data privacy	The right to keep information private and away from those you do not wish to have access.
Encrypt	To secure information by converting it into a code made up of letters, numbers and symbols which cannot be understood by those that do not have access.
Infrared waves	The red section of the electromagnetic spectrum, which is invisible to the eye but can transmit small amounts of data.
NFC	Near Field Communication. Enables data transmission between 2 devices up to 4cm away. NFC is often used for contactless payments from devices such as smart watches.
QR code	Quick Response code. Is presented in a similar way to a bar code and when scanned, can take you to a specific website or provide information.
Radio waves	Invisible electromagnetic waves that can transmit information via an antenna, which converts the electrical signal it receives into another format, for example, a sound wave.
RFID	Radio Frequency Identification is a device that uses radio signals to check where something or someone is.
Signal	A voltage, current or electromagnetic wave that is either sent or obtained.
Systems or data analyst	A person who manages, sorts, analyses and models data to identify key trends and solve problems within a system.
Transmission	When something is passed or sent to another place.

Key facts

Infrared light can be used to:

> Transmit small amounts of data, such as a remote control beaming the instruction to turn the TV on and off or change channel.
> Provide warmth from electrical heaters.
> Heat up and cook food.
> Detect heat through thermal imaging cameras.

How do barcodes help libraries track book borrowing?

1. Choose a book to borrow from the library and find the barcode.

2. Take it to the self-scan to check the book out of the library. — Checked out

3. The system will warn the librarian that your book is almost due back. — This book is due back tomorrow

4. Return and scan the book to check it back in to the library. — Returned

Year 6 – Big Data 2 - Knowledge Organiser

Big data 2

Big data	Massive deposits of information that continue to be collected through the internet, used by data analysts to investigate, analyse and determine ways to improve businesses.
Bluetooth	Device to device connectivity, for example sharing images between two smart phones.
Corrupt data	When data becomes unstable, unusable, unreadable from either transfer or storage.
Digital revolution	An era beginning in the 1980s, when technology began to develop from using analog to digital technologies. It is sometimes known as the Third Industrial Revolution.
GPS	Global Positioning System, designed to monitor satellite data to determine your position on Earth, for example in a car sat nav system.
Infrared waves	The red section of the electromagnetic spectrum, which is invisible to the eye but can transmit small amounts of data.
Internet of Things (IoT)	A network of smart devices around a building that collect, monitor and distribute data to work harmoniously together.
QR code	Quick Response code. Is presented in a similar way to a bar code and when scanned, can take you to a specific website or provide information.
RFID	Radio Frequency Identification is a device that uses radio signals to check where something or someone is.
SIM	Subscriber Identity Module. A SIM card includes a chip that stores a unique IMSI (International mobile subscriber identity) to enable you to register your mobile phone number.
Computer simulation	Computer generated imitation of something such as a program test or product prototype.
Smart school/city	A school or city, which uses IoT technology to monitor and react to events, so that they can operate in a more interactive way, in real time.

What does 100mb look like (approximately)?

- Four hours browsing the internet
- One 30 minute episode on TV
- Send 3,000 emails, without attachments
- One hour on interactive online maps
- 30 minutes on a video call
- Listen to 25 music tracks
- Stream six four-minute videos
- Send 3,000 instant messages

Key facts

There are various methods of wireless data transfer. Examples of these are:

Machine-readable (visual) codes:

Barcodes   QR codes

Wireless radio communication methods:

NFC   Bluetooth

RFID

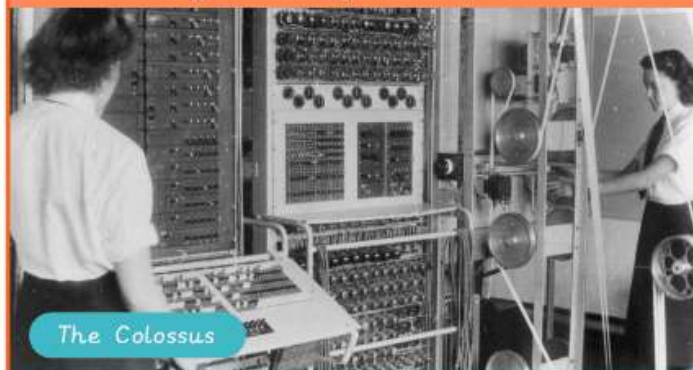# Year 6 – Bletchley Park - Knowledge Organiser

Bletchley Park 1

Acrostic code	A type of code where the first letter of each word, line, or paragraph when put together spells a message.
Brute force hacking	When someone, known as a hacker, uses different types of methods, such as trial and error, to crack entry into secured information.
Caesar cipher	A way in which every letter is replaced with another letter in a fixed number of places down the alphabet.
Chip and pin system	A payment system to buy something securely where a plastic bank card, such as a debit or credit card, has a chip in it, which the card owner can access by entering a Personal Identification Number (PIN).
Cipher	Information that is written in a secret way, also known as a code.
Date shift cipher	A code derived from the date that tells you how many spaces to move each of the letters in the coded message. For example, the date 1 January 1984 written in date format becomes '01011984'. This tells you to move the first letter of your coded word 0 spaces, the second letter by 1 space etc.
Encrypt	Converting information/data into a secret code or message, to avoid unauthorised access.
Invention	A new device or process that solves a problem.
Nth letter cipher	A type of code where you choose the Nth letter of the text /code again and again until the text ends. Say N=10, then you find every 10th letter in the text/code till you reach the end of it, to reveal a secret message.
Password	A unique combination of letters, numbers or symbols that protects personal information online.
Pigpen cipher	A substitution code, where letters are exchanged for symbols, which are parts of a specific grid.
Technological advancement	When scientific discoveries are made that can lead to the development of new or existing technologies to improve on current processes in life.
Trial and error	To test a method of resolving something, and if it fails, to try another method and continue this process until success has been achieved.

Key facts

Over 10,000 people worked for Bletchley Park. Over 75% of the workers were women.

In 1943, the Colossus computer was constructed by codebreakers during World War II. This enormous machine was the world's first electronic programmable computer. It took hours rather than days and weeks to crack encrypted messages to help win the war.

The Colossus

Enemy messages, which were encrypted, had to be written down on paper. Then they were sent over to Bletchley Park, often by motorbike.

Example:
Date shift cipher:

Visual representation:
Date used to encrypt the message: 1st January 1984
In number format this would read: 01 01 1984

Original message: h e l l o

Each letter shifted: 0 1 0 1 1

Encrypted message: h f l m p

a b c d e f g h i j k l m n o p q r s t u v w x y z

st M

Background noise	A (secondary) sound that is there but your focus is not fully on it as you are focussed on another (primary) sound.
Byte	A byte is made up of 8 bits. One bit contains a single binary value - 0 or 1.
Computer	Electronic machines that accept and process information to produce an output, and then store the results.
CPU	Central Processing Units are the brains of a computer and deal with all of the data it receives from input and output devices, as well as programs ran within the computer.
Memory storage	A portable, compact form of digital storage, used to transfer files from one device to another, or keep safe.
Mouse	A handheld hardware input device that can move and select text, icons, files, and folders on your computer.
Operating system OS	The base software needed on a computer for it to manage basic commands, hardware and software and provide a user-friendly interface.
Radio play	Scripts and written text for broadcasting on-air.
RAM	Random Access Memory. A piece of hardware that allows data to be recalled or stored within a computer.
ROM	Read Only Memory. Information stored within ROM can only be read and not edited.
Sound effects	Sounds to enhance an event or bring fantasy aspects to life in a film or other media, for example, the whoosh of a time machine.
Touch screen	Allows the user to use their finger or multiple-finger gestures to control the device via the screen.
Trackpad	An input device commonly found built into laptops. It is used to move the cursor with the touch of your finger, and some allow for multiple finger gestures.

Memory sizes:	Bytes:	Invented:	Abbreviation:
1 kilobyte	1,000	1950	(kb)
1 megabyte	1,000,000	1956	(mb)
1 gigabyte	1,000,000,000	1986	(gb)
1 terabyte	1,000,000,000,000	2007	(tb)

Bletchley Park and Y Service locations in Britain:

Bletchley Park

Y Service stations:
1. Scarborough
2. Flowerdown
3. Cheadle
4. Chatham

Bletchley Park worked closely with the 'Y Service' of British wireless intercept stations. The operators here would tune-in to enemy radio messages, in an attempt to gain snippets of information, to send back to Bletchley Park for deciphering.

Bletchley Park would have to stitch together the snippets received from the 'Y Service' to decrypt the complete message.

Introduction to Python

Algorithm	A sequence of instructions which, when followed, solve a problem.
Code (computer)	A set of instructions written in programming language, to tell a computer what to do.
Computer command	To give an order or instruction to a computer, to complete a particular task.
Decompose	To break something down into smaller chunks.
Import (software)	To pull another file into software, to place, edit and manipulate.
Indentation (programming)	In programming (for example Python), indentation is used to define a block of code.
Loop	A repeated sequence of instructions.
Nested loop	A loop, within a loop.
Random numbers	An unpredictable sequence or reveal of numbers.
Remix	Something that has been reworked to produce a varying version of the original.
Script libraries	A series of pre-written, functional codes that can be accessed and imported into a program to save time.
Variable	This could be a number or text, that can change each time the program is run and often in combination with selection to change the end result of the program.

Did you know?

Python is used to teach computers how to think for themselves!

This is sometimes known as artificial intelligence (AI) or machine-learning.
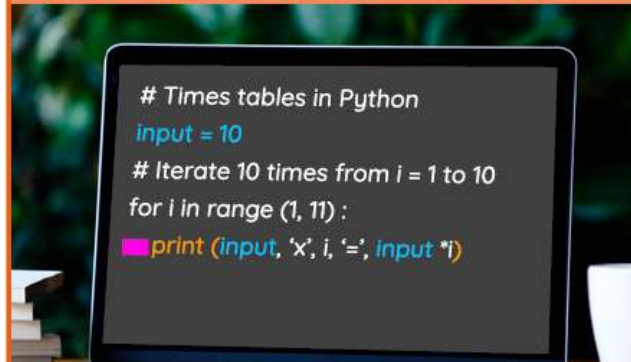
They can learn skills such as speech recognition.

Key facts

Python program to display times tables:

Try this Python code out yourself, and change the variable (input = 'x') to display a different times table chart.

```
# Times tables in Python
input = 10
# Iterate 10 times from i = 1 to 10
for i in range (1, 11) :
    print (input, 'x', i, '=', input *i)
```

- Indentation
- Variable
- Loop

Algorithm to make a cup of tea:

The steps in the algorithm must be followed, if we ignored step one, we would have no hot water!

1. Mug and hot water
2. Add teabag
3. Remove teabag
4. Dash of milk

Year 6 – Skills Showcase - Knowledge Organiser

Adapt	To adjust something or someone, in order to improve a situation or a purpose, to become more effective.
Advertisement	Used to promote or announce something to the public through videos, voice or images broadcast on television and radio.
Algorithm	A sequence of instructions which, when followed, solve a problem.
Bug	A mistake or error in the code, stopping the program from working as intended.
CAD	Computer-aided design software used to create graphics, diagrams or other visuals.
Computer code	A set of instructions written in programming language, to tell a computer what to do.
Code (verb)	To write in programming language (code).
Design	To make, draw or write plans for something.
Edit	To change and amend something.
Electronic components	The parts that make up an electrical device or product with processing capabilities.
Image rights	The picture or image belongs to someone or a company.
Image	A picture of people or objects.
Input	Information sent to a computer by an input device such as a keyboard or mouse for processing.

Information	Knowledge which can be remembered, written in documents or stored in different forms as data, such as in video files and audio recordings.
Invention	A new device or process that solves a problem.
Loop	A repeated sequence of instructions.
Output	Information or data that is sent by the computer to an output device such as a printer or speakers.
Photo	Images that are taken by a device called a camera.
Program	A series of code that instructs the computer to perform specific tasks.
Repetition (code)	To create loops in your program, to make it more efficient.
Screenshot	A captured image of what is currently on the screen or monitor.
Selection (programming)	Where an algorithm or program branches off. It allows the computer to change what it does, depending on the information received.
Sequence	A set order or pattern for something to follow.
Variable	This could be a number or text, that can change each time the program is run and often in combination with selection to change the end result of the program.
WWW	The acronym used to express the 'World Wide Web'. It is found at the beginning of website addresses e.g. www.kapowprimary.com