



# YEAR 7

# COMPUTER SCIENCE

KNOWLEDGE ORGANISER

The computer science department are introducing a new learning initiative in which all students in Key Stage 3 will be provided with knowledge organisers. We believe these will have a positive impact on your child's achievement and approach to revision, providing them with the best opportunity to be successful during assessments and examinations.

We have created a bank of resources, known as knowledge organisers, to be used both at home and in lesson. National research demonstrates knowledge organisers have a significant impact on the progress made by all students, no matter what their ability is. As a parent/carer it will also provide you with the opportunity to support your child at home.

**How you the parent/carer can help:**

- Print off and pin up knowledge organisers along with your child's timetable
- Encourage and reward your child when doing homework and revision
- Use the knowledge organisers to test and quiz your child on the current topic

# HALF TERM 1

## IMPACT OF TECHNOLOGY – COLLABORATING RESPONSIBLY

### Social media settings

- Profiles should always be set to private
- Profile images should not reveal locations
- Profile images should not be easy to recognise; it is much better to use a picture of a pet or a cartoon character
- Don't reveal locations — this makes it easy to find out where you are.
- Making your date of birth public makes it easy for hackers to steal your personal information and set up fake accounts in your name.
- You should never reveal your phone number, email address, or home address on a public site
- You should never reveal your current location on social media
- Putting your full name, including a middle name, makes it easy for someone to steal your personal information. Always use a nickname or shortened version of your name

### Do you really want to send that?

Think before you click.

It is easy to send comments from the other side of a screen.

It is not easy to then remove them.

Actions need to be considered before mistakes are made.

### Secure passwords

No one should be able to guess/work out your password.

Current government advice is to use 3 random words

### Using technology appropriately, carefully and positively leads to positive digital citizens.

Digital citizenship is the responsible use of technology by anyone who uses computers, the Internet and digital devices to engage with society on any level.

### Where to get help

Talk to a trusted adult

<https://www.ceop.police.uk/>

<https://www.childline.org.uk/>

Cyberbullying is similar to bullying but tends to occur online. Cyberbullying can come in many forms. Some examples are:

- Threatening someone to make them feel scared
- Harassing someone by repeatedly sending them messages
- Ruining somebody's reputation
- Excluding someone from a group
- Stealing someone's identity and pretending to be them
- Publicly displaying private images or messages

### Key Words

Audience	The people you are communicating, presenting information to
Catfishing	A person pretends to be someone they are not.
Collaboration	Working effectively together
Digital tattoo/Digital footprint	Online reputation that is permanent
Email	A tool for online communication
Hazards	Areas/items that could cause damage or injury
Network	Devices are connected together usually by cable or Wi-Fi.
Password	A way to ensure no one access your data or information
Respect	Be mindful of how you are responding to others
Secure	Making sure your online information is safe

## HALF TERM 2

### MODELLING DATA – SPREADSHEETS

**Data and information** are not the same.

- **Data:** facts and figures in their raw form
- **Information:** data that has been given structure or meaning

For example:

**Data**—10, 2107, 18

**Information**—Time 10am, date 21st July, temperature 18°

The tool bar ribbon at the top allows for **formatting** of the data. Changing colour, size, style etc

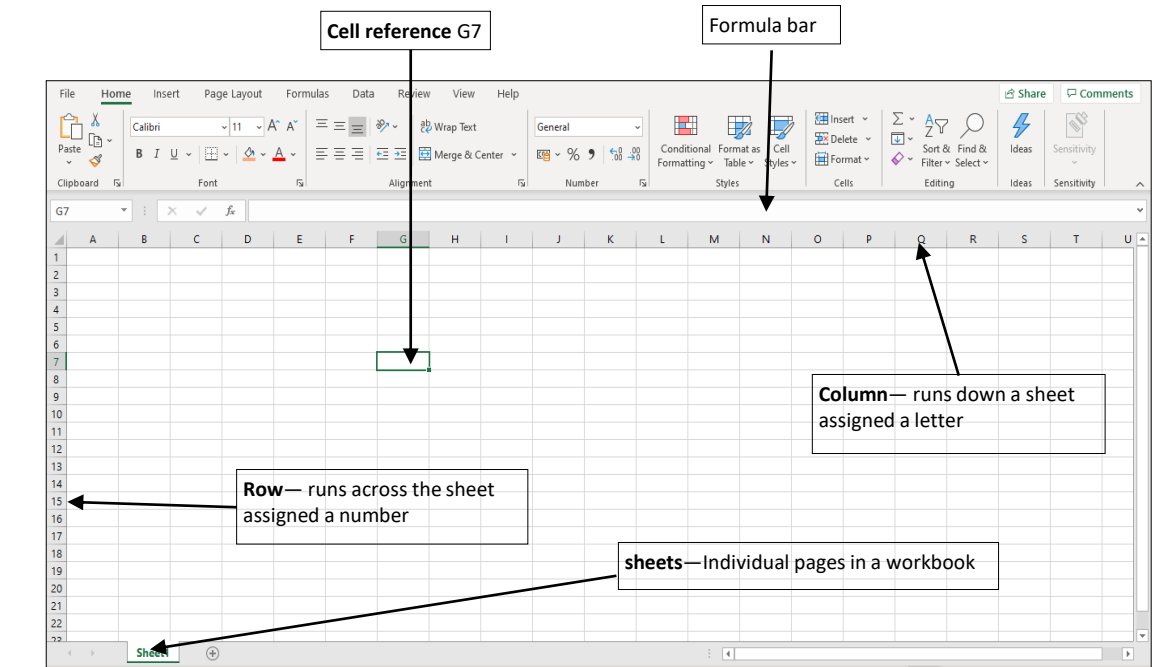
There is a **sort** and **filter** tool that allows for data to be arranged in ways that is most useful for the user e.g. alphabetical, highest, lowest etc.

**Conditional formatting** can be set to allow the cell **formatting** to **automatically** change if certain criteria is met. For example a cell might turn red if there was a negative number

In order to complete calculations spreadsheets make use of **formula**.

A formula uses the following basic symbols  
The = symbol is always at the start of a formula  
The + symbol is used for addition  
The - symbol is used for subtraction  
The \* symbol is used for multiply  
The / symbol is used for divide

Functions are also used which are predefined formula.



Common **functions** are

**SUM**—adds a range of cells

**MAX**—returns the largest value from selected cells

**MIN**—returns the smallest value from selected cells

**AVERAGE**—provides the arithmetic mean (average) of selected cells

**COUNTIF**—counts the number of cells in a range that meet the given criteria

**IF**— allows logical comparisons

**COUNTA**—counts cells that are not empty

Data can be gathered from different sources

- **Primary** source: collecting data yourself
- **Secondary** source: someone else collects the data

Each box on a spreadsheet is called a **cell** and they hold data.

Each **cell** has a unique **cell reference** to identify its location.

# HALF TERM 3

## NETWORKS

A **network** is where devices are connected together usually by cable or Wi-Fi. This could be a few computers in a room, many computers in a building or lots of computers across the world.

### Wired and Wireless data transmission

A computer network can be either wired or wireless.

- Wired networks send data along cables.
- Wireless networks send data through the air using radio waves.

**Bandwidth**—Bandwidth is the amount of data that can be moved from one point to another in a given time. Higher bandwidth = more data per second

**Bandwidth** is measured in bits per second

A bit is the smallest unit of data  
Data transfer rates are now so good that bandwidth is usually measured in Megabits per second (Mbps)  
1Mb—1 million bits

### Internet services

There are a range of services provided by the internet. These include:

- World Wide Web
- Email
- Online gaming
- Instant messaging
- Voice over IP (VoIP) – audio calls
- Internet of Things (IoT)
- Media streaming (e.g. watching Netflix online)

The rules for each service are different. As a result, a different protocol is used.

HTTP—HyperText Transfer Protocol—used so that data can be understood when sent between web browsers and servers.  
HTTPS—is the secure version of HTTP where data sent is encrypted.

**Network Hardware**—physical equipment required to set up a network

**Hub**—Connects a number of computers together. Ports allow cables to be plugged in from each connected computer.

**Router**—Used to connect two separate networks together across the internet

**Server**—A powerful computer which provides services to a network

**Cable**—Used to connect different devices together. They are often made up of a number of wires.

### Key Words

Key Words	
Bandwidth	Amount of data that can be moved from one point to another in a given time.
Buffering	Data arriving slower than it is being processed
Internet	A worldwide network of computers
internet of Things (IoT)	Takes everyday 'things' and connects them to the Internet e.g. smart light bulb, fridge, heating etc.
IP address	A unique address for every device on the internet
Packet	Networks send/receive messages in units called packets
Protocol	All methods of communication need rules in place in order to pass on the message successfully. These sets of rules are called 'protocols'
Search Engine	A website that allows user to look up information on WWW e.g. Bing, Google etc.
Web browser	Piece of software( code) used to view information on the Internet
WWW	Part of the Internet that contains websites and webpages. NOT the same as the Internet.

# HALF TERM 4

## PROGRAMMING 1 - SCRATCH

A computer inputs (this might be automatic or via human input), processes that input and then produces an output. as well as producing an output. For example when you use a keyboard and mouse, the mouse is used to input data into the computer to be processed and the output is visible on the computer monitor.

**Variables** are used to store data for use in a program. They can store lots of different types of data such as names and scores. So set variable score to equal 0  
If I score a goal then increase variable by 1

**Operators**  
Comparison operators allow us to compare using < > +  
Logical operators use **AND, OR, NOT**

A **selection** statement in programming allows a computer to **evaluate** an **expression** to **'true'** or **'false'** and then perform an action depending on the outcome.



**Count controlled iteration** will execute the commands a set number of times. Example: "perform 200 star jumps"  
**Condition-controlled iteration** will execute the commands until the condition you set is no longer being met. Example: "perform star jumps until 3pm"

We use algorithms in every day life . Example an algorithm to get to school, to make a cup of tea, to make a pizza, to order a takeaway. These are just precise sequences of instructions.

### Key Words

Abstraction	Identify the important aspects to start with
Algorithm	Precise sequence of instructions
Computational thinking	Solving problems with or without a computer
Debugging	Looking at where a program might have errors or can be improved
Blocks	Scratch bricks that we can use to code algorithms
Decomposition	Breaking down a problem into smaller parts
Execute	A computer precisely runs through the instructions
Iteration	Doing the same thing more than once
Selection	Making choices
Sequence	Running instructions in order
Variable	Data being stored by the computer

**Sequence, selection and iteration** are all processes. In order for computers to perform tasks there is more that is needed. For example a computer will take an **input** (this might be automatic or via human input) which the computer will then **process** and the **output** will be visible on the computer monitor.

Scratch is a block based programming language. We can use predefined code drag and drop blocks to create a sequence of code.

# HALF TERM 5

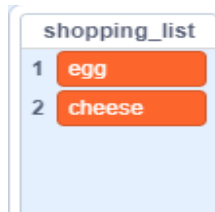
## PROGRAMMING 2 - SCRATCH

**Variables** are used to store **data** for use in a program. They can store lots of different types of data such as names and scores.

So set variable score to equal 0  
If I score a goal then increase variable by 1  
**A variable can only hold 1 piece of data at a time.**

**Lists** are used to store data for use in a program.

Lists can hold multiple items of data under one name. Just like a shopping list where you can keep adding items.



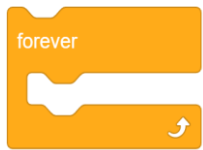
**Sequence, selection and iteration** are all processes.

These are three of the key concepts –the BIG 3  
**Sequence**—the challenge of arranging precise instructions into the correct order  
**Selection**—allowing a program to branch down a different route IF a condition is met  
**Iteration** (repetition) - allowing a repetition of commands by looping back.

**Iteration** allows for the same code to be repeated.

**Count controlled iteration** will execute the commands a set number of times  
Example: “perform 200 star jumps”

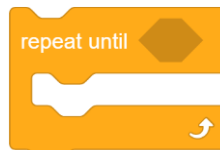
**Condition-controlled iteration** will execute the commands until the condition you set is no longer being met  
Example: “perform star jumps until 3pm”



Will loop the code forever



Will repeat a set number of times

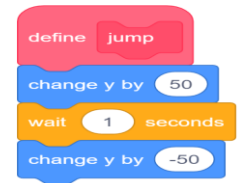


Will repeat until a condition is met

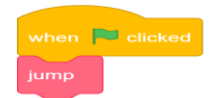
## Key Words

Abstraction	Identify the important aspects to start with
Algorithm	Precise sequence of instructions
Debugging	Looking at where a program might have errors or can be improved
Decomposition	Breaking down a problem into smaller parts
Iteration	Doing the same thing more than once
Lists	Allows multiple items of data to be held
Selection	Making choices
Sequence	Running instructions in order
Subroutine	A group of instructions that can run when called
Variable	Data being stored by the computer.

This subroutine had been named ‘jump’. The y axis has been changed by 50 (so jump up), wait 1 second then jump down (-50).



Then the jump subroutine can be called in the program.



# HALF TERM 6

## USING MEDIA

Different **application software** can be used for different purposes. It is important to think about what the task is and select the most **appropriate** one.

The **application software** chosen allows different formatting techniques to be used.

**Formatting** can be using tools like **bold**, *italic*, underline, changing colour, font style and size, alignment and many more.

**Formatting** can be used for many reasons. Including to make text easier to read, easier for the audience to use, highlight important information or attract attention.

It is important to select the appropriate formatting for the audience

**Images** play an important role when using software. It is important that **appropriate** images are used, ones that meet the requirements of the **audience** and the **purpose** of whatever is being created.

When researching and reading stories online you need to check that they are **reliable, trustworthy** and **credible**. Anyone can upload content so it is not always accurate.

- Check the source, find out which other sources are reporting it
- Check whether other sites are saying the same thing,
- Don't trust all the stories and all pictures
- Check for facts not rumours
- Check any citations or references

When you are researching a topic you will come across a lot of useful information. Once the reliability and accuracy has been checked you may decide to use the information. Check the law

**Plagiarism** using someone else's work or ideas and using them as if they were your own. This can be any type of work either printed or electronic.

**Citation** the audience where the information came from. Anything that is used needs to have **citations** or **references** to the original work. the audience details about the source so that they can see that the source is relevant and recognised so they can find the source themselves if they want to.

**Copyright Law** gives the creators of literary, dramatic, musical, artistic works, sound recordings, broadcasts, films and typographical arrangement of published editions, rights to control the ways in which their material may be used.

**Creative Commons(CC)** license is one type of copyright license. This allows the copyright owner to say exactly what other people can and can't do with or to their work.

They help copyright owners share their work while keeping the copyright. For example, a Creative Commons licence might allow other people to copy and distribute the copyright owner's work, if they give them credit.

Making sure the item being created is successful and actually does what it was intended to do is important.

Setting **success criteria** should be determined at the start of the project and can be revisited frequently.

The success criteria should be clear and easy to follow.

A **blog** is simply a regularly updated website or web page, typically one run by an individual or small group, that is written in an informal or conversational style.