

# Unit 1 Online Safety: Journey of Knowledge

## Context and Introduction to unit: *Overview statement of the unit.*

*Pupils will learn the difference between inappropriate contact and content. Pupils will be able to describe addictive and human features of apps and thereby be able to use apps safely. Pupils will learn about fake news and the different types of false information.*

## Prior Knowledge

*Pupils understand how to communicate safely and respectfully online. Pupils understand the different types of cyberbullying.*

## Career links

Cybersecurity Analyst

Network pen testing

IT Technician

## CORE KNOWLEDGE

1. Office 365 is cloud computing
2. Password should contain letters, numbers and special characters
3. National Centre Cyber Security recommends using three random words.
4. Brute force attacks – Hacker uses multiple attempts to guess your password until its cracked.
5. Brute force attacks can be prevented through 2-Factor Authentication and limited password attempts.
6. Online communication is different to off line communication.
7. Emails must contain subject, introduction, suitable message, sign off
8. Digital footprint can be passive or active.
9. Active is the content you post willingly.
10. Passive is the data that is collected about you unknowingly such as your IP address and log in / log out times.
11. Digital identity is what people think about you from what you post online.
12. To be authentic online means you're true to your own identity.
13. Having an authentic online identity means you will post images without filter, post under an accurate name and will not post false information about your life.
14. Pseudonymous means written under a false name/profile.
15. Verified means written under an accurate name/profile.
16. IP address – A unique address linked to your internet connection. Many devices on the same connection can share an IP address.
17. Inappropriate content – things you don't want to see online. Inappropriate contact – People you don't want to talk to online.
18. Invisible audience are unknown people who can see information about you posted online.
19. Online reputation is important as it might affect your future.
20. Digital media is electronic communication used sharing ideas, content, information and messages.
21. A habit is something we do without thinking.
22. Addictive design is features or aspects of a device or app that are intended to hook the user into frequent use.
23. Humane design are apps which have features which make people's lives better.
24. A feedback loop is a response to something you do or post online that causes your brain to experience a temporary moment of pleasure.
25. News we read is not always reliable.
26. We can spot fake news if it does not sound real, if we cannot find evidence of a source/author and if no other websites post the same story., This is known as a "REAL' check.
27. Misinformation. False information. Person sharing does not realise.
28. Disinformation. False information deliberately shared to harm people.
29. Malformation. True information which would be harmful to share.

## ABOVE AND BEYOND

Pupils will learn about the difference between social engineering and malware.

## VOCABULARY

Authentication  
 Inappropriate  
 Audience  
 Reputation  
 Pseudonymous  
 Verified  
 Addiction  
 Humane  
 Misinformation  
 Malformation  
 Disinformation

## WHERE NEXT?

**Unit 2 – Computer systems**  
**Pupils will build upon their knowledge of online safety by learning how data is processed by computers and how data is transmitted over networks.**

## KS3 NC links

Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

# Unit 2 Computer Systems and networks : Journey of Knowledge

## **Context and Introduction to Unit *Overview statement of the unit.***

*In this unit pupils will learn about the role of a CPU and the difference between storage and memory. Pupils will be introduced to networks and explore the benefits and risks of a computer network, the difference between LAN and WAN networks. Pupils will learn how to improve the performance of a network.*

### **Prior knowledge (KS2)**

Pupils can identify the components inside a PC including CPU, Motherboard, hard Drive and RAM. Pupils understand the difference between hardware and software.

### **Career links:**

*Data analysis*

*IT Technician*

*Software / App developer*

## **CORE KNOWLEDGE**

- 1.The CPU is the brain of the computer.
- 2.The CPU stands for central processing unit.
- 3.The purpose of the CPU is to process data and instructions.
- 4.The function of the CPU is to carry out the FDE cycle.
- 5.An increase in cache improves the performance of the CPU.
- 6.An increased clock speed improves the performance of the CPU.
- 7.RAM is short term memory. It is Volatile memory which needs power to store information.
- 8.Hard Drive is long term memory. It is non-volatile and once the power is switched off information is stored.
- 9.An embedded system is specifically designed to perform one specific task.
- 10.A network is where two or devices are connected together to communicate.
- 11.The benefits of networks include sharing peripheral devices, software and an internet connection.
- 12.LAN is a local area network which is used in school and at home
- 13.WAN is a wide area network. A WAN is a series of LANs connected together.
- 14.Each computer connected to a server is called a client.
- 15.A network can be wired or wireless.
- 16.Bandwidth measures the amount of data that can transfer through communications channel over a given period of time.
- 17.Latency is how long the data takes to travel through a network.
- 18.A wired network will transfer data faster than a wired network.
- 19.If computers are connected in a network they are exposed to threats such as a virus and hackers.
- 20.A firewall is used to protect a network from unauthorised access.

## **ABOVE AND BEYOND**

Pupils could learn about the hardware required to build a computer network.

### **VOCABULARY**

Computer architecture  
Volatile  
Central Processing Unit  
Cache  
Clock speed  
Hard Disk Drive  
Embedded  
Memory  
Secondary  
Network  
Client  
Wired and Wireless  
Badwidth  
Latency  
Client  
Firewall

## **WHERE NEXT?**

### **Unit 3 Data Representation and computational Thinking**

**Pupils will build upon their knowledge of networks and computer components by learning how data is represented in computer systems and the stages of computational thinking .**

### **KS3 NC Links**

Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems understand how instructions are stored and executed within a computer system.

# Unit 3 Representing Data and Computational Thinking : Journey of Knowledge

## **Context and Introduction to Unit: Overview statement of the unit.**

*In this unit pupils will build on their existing knowledge of data representation and will be able to add binary numbers. Pupils will be introduced to logic gate and will learn how NOT, AND and OR gates work, applying them to real-life situations. Pupils will learn about the purpose of searching algorithms and will be able to complete linear and binary searches.*

## **Prior knowledge**

*Pupils understand that all information processed in a computer must be converted to binary. Pupils can convert binary to denary and vice versa. Pupils understand the four computational Thinking techniques and can construct flowchart algorithms.*

## **Career links**

*Programmer / developer*

*Games developer.*

*Web developer*

## CORE KNOWLEDGE

1. Binary is a number system that only uses two digits: 1 and 0. All information that is processed by a computer is in the form of a sequence of 1s and 0s.
2. People use the denary (or decimal) number system in their day-to-day lives. This system has 10 digits that we can use: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.
3. I can convert 8 bit binary numbers to denary and vice versa
4. There are four rules that need to be followed when adding two binary numbers. These are:
5.  $0 + 0 = 0$
6.  $1 + 0 = 1$
7.  $1 + 1 = 10$  (said one zero and is binary for 2)
8.  $1 + 1 + 1 = 11$  (said one one and is binary for 3)
9. Sometimes, when adding two binary numbers we can end up with an extra digit that doesn't fit. This is called an overflow error.
10. A computer is a collection of powered and unpowered circuits and transistors. A logic gate is a series of transistors connected together to give one or more outputs,
11. Each logic gate can be represented as a truth table.
12. A NOT gate takes in input and reverses it.
13. An OR gate takes two inputs and gives an output of 1 when ANY of its inputs are 1, otherwise its output will be 0.
14. An AND gate takes in two inputs and gives an output of 1 when BOTH of its inputs are 1, otherwise its output will be 0.
15. A linear search is the simplest method of searching a data set. Starting at the beginning of the data set, each item of data is examined until a match is made. Once the item is found, the search ends.
16. A binary search is a more efficient algorithm than a linear search.
17. A binary search can only be performed on an ordered list.
18. When completing a binary search start look at the middle position in the list. If the value held there is a match, the search ends. If the value is lower remove the upper half and vice versa. Repeat the process until the search is complete.
19. Pseudocode is an alternative way to flowcharts represent a computer program.

## ABOVE AND BEYOND

Pupils could learn about how programmers use hexadecimal and be able to convert from binary to hexadecimal.

## VOCABULARY

Binary  
Denary  
Algorithm  
Overflow  
Circuit  
Transistor  
Boolean  
Logic  
Truth table  
Linear  
Binary search  
Array  
Pseudocode

## Where next?

Pupils will be able to use computational thinking skills to design and develop programs.

## KS3 NC Links

- Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems.
- Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem

# Unit 4 Python programming : Journey of Knowledge

## Context and Introduction to Unit:

In this unit pupils will build on their existing knowledge of programming. Pupils will learn how selection is used and will be able to program using if, elif and else. Pupils will be introduced to built in modules such as 'import random'

## Prior knowledge:

Pupils have learned about key programming concepts including sequencing, variables, inputs and data types. Pupils have practiced programming using Micro-Bits (Block based) and Python (Text based)

## Career links

Programmer  
Games Designer  
Machine learning engineer  
Software Engineer  
Data Scientist

## CORE KNOWLEDGE

1. Python is a high level, text based programming language.
2. High level languages are converted into binary
3. Sequencing is carrying out instructions in the specified order.
4. A syntax error is where the rules of the language have not been followed.
5. Selection is when a program makes a decision.
6. IF statements happen when a program makes a decision.
7. ELIF/ELSE means "if the previous conditions were not true, then try this condition"
8. conditional expressions are features of programming language, which help the code make a choice and result in either TRUE or FALSE.
9. A string is letters or

## Core Python Syntax

Logical operations	< > >= <= != ==
String handling	Length stringlength = len(string) substring substring = string[0:3]
Selection statements – If	if elif else
Random	Import random
Data types	Integer int()
Iteration	for loop – repeat for i in range (0,20)

## ABOVE AND BEYOND

Use of while loops  
Use of lists  
Integration with hardware - microbots.

## VOCABULARY

Algorithm  
Python  
Syntax  
Input  
Print  
Variable  
Assign  
Integer  
String

## WHERE NEXT?

Pupils will develop their knowledge of programming and syntax to learn how to use modelling software writing complex formulas.

## KS3 NC Links

Use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming.

# Unit 5 Modelling: Journey of Knowledge

## **Context and Introduction to Unit:**

Pupils will build upon their knowledge of programming to learn how to use combine multiple software to analyse data and meet the needs of users.

## **Prior knowledge (KS2)**

select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

## **Career links.**

*Database administrator*

*Software Developer*

*IT Training*

*SQL programmer*

## **CORE KNOWLEDGE**

1. Primary data – Data you collect
2. Secondary data – Data that somebody else has collected
3. Data and information are different. Data is what is input into a computer and information is what is output after the data has been processed
4. Worksheet- The page you are working on which looks like a grid
5. Cell- Each box in the grid is called a cell.
6. Active Cell- When you click on a cell to choose it, it becomes the active cell and has a thick black line around it.
7. Row- The grid has rows labelled with numbers. A row goes across the grid.
8. Column- The grid is made up of columns that are labelled with letters. A column goes down the grid.
9. Value- Values are the numbers we have to put into a spreadsheet so that it can do calculations for us.
10. Labels- Labels are pieces of text that we add to the spreadsheet to give us information about the numbers
11. Formula- Formulas are used to work our simple calculations in a cell – Example = C5 + B5
12. Formula symbols
  - = All Formulas start an equals.
  - + This symbol is used to add numbers together.
  - - This symbol is used to takeaway numbers.
  - \* This symbol is used to multiply numbers together.
  - / This symbol is used to divide numbers

## **Core functions**

Functions- SUM – Adds up a range of selected cells. MIN – Finds the minimum value of selected cells. MAX – Finds the maximum value of selected cells. COUNTA –Counts the number of non blank cells AVERAGE – Gives the average of a group of highlighted cells COUNTIF Counts the value in a cell if a condition is met

Conditional Formatting – Change appearance of a cell depending on the cell's value.

IF Statement: logical formula: IF, then, else. If something is true, then do this, else/otherwise do that.

## **ABOVE AND BEYOND**

Pupils could learn how businesses use spreadsheets. Pupils could produce charts and nested IF statements.

## **VOCABULARY**

Primary  
Secondary  
Data  
Information  
Worksheet  
Cell  
Formula  
Function  
Process  
Condition  
Label

## **WHERE NEXT?**

Year 9

## **NC KS3 Links**

Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability