GCSE Computer Science
Autumn: Learning Journey

UNIT: Half Term 1

What are we learning about?
In this unit of work you are going to look at:-
The purpose and function of a CPU,
Systems Architecture,
Memory types and uses,
Types of Storage and device ranges,
Ethical and Legal Concerns,
Intro to Python,
What is Binary?

Why are we learning about it?
We are learning about how a machine architecture works so you can understand how a computer functions. There are many different memory types and storage devices, and you will learn to identify the most appropriate uses of each. You will identify concerns with ethical issues including privacy. Computers must be programmed and you will learn to program in Python. Computers are based on binary 0s and 1s and you will learn about this.

What new **KNOWLEDGE** will I gain?
You will understand about the von Neumann Architecture and the types of memory used to include registers. You will learn about a range of storage devices and which is best for which purpose. You will be aware of Privacy, security and other concerns. You will learn how to make basic programs in Python and understand about 0 and 1 in binary.

How does this build on the **KNOWLEDGE** I already have?
These topics will build on the knowledge from KS3. You will learn about the JvN Architecture which builds on internal components from KS3. You will learn a larger range of storage devices and look more at how our lives are affected by privacy issues. You will build on your Python knowledge. You will finally build on binary knowledge of calculations.

What new **SKILLS** will I develop?
You will understand how the architecture of a system works. You will be able to suggest appropriate memory types and storage devices for specific tasks. You will be able to explain privacy issues. You willl be able to program with more confidence in Python and you will be able to do basic calculations in binary.

How does this build on the **SKILLS** I already have?
This course will develop your ability to go further than the motherboard and look at how the architecture works. You will be able to identify and suggest memory and storage devices rather than just identify them. You will be able to improve privacy. You will be more confident in Python, identifying code and be able to do basic calculations in binary.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work we are going to look at:-
More on the CPU and Architecture to ensure full understanding.
Understanding the software used by the system and the security methods needed.
What computational logic is.
Calculations in binary.

Why are we learning about it?

We are learning more about the CPU to ensure we have a firm understanding of the internal computer system. To understand the software needed for a system and the security needed to protect the system. To understand logic gates as part of a decision process as decisions are integral to computer systems. So we can add and subtract in Binary.

What new **KNOWLEDGE** will I gain?

You will understand about system software, what it does and its purpose as well as the solutions needed to protect the system. You will learn about decision gates and truth tables. You learn how to calculate in binary.

UNIT: Half Term 2

How does this build on the **KNOWLEDGE** I already have?

We will re-enforce and clarify understandingg of the JvN Architecture and CPU. We will learn about system software, building on from basic application software in KS3 and Test 3 of KS4 Book tests. We will build on IF statements and flowcharts doing logic gates and we will build on Binary identification to adding and subtracting.

What new **SKILLS** will I develop?

You will be able to identify system software is and how to protect it. You will be able to create logic gates and read truth tables. You will be able to perform adding and subtracting using two's complement in binary.

How does this build on the **SKILLS** I already have?

You already understand JvN, this will reinforce this knowledge. You have understanding of application software, this will give you the skills to identify system software. You understand IF statements, this will introduce you to logic gates and truth tables so you can read them. Finally, you have learned 0, 1 and how to work out binary numbers, this unit will teach you how to add and subtract in binary.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work we are going to look at:-
More on system software and security,
We will introduce networks,
Learn more about ethical and legal issues,
Understand what an algorithm is, and continue to develop our Python Skills.

Why are we learning about it?

We are learning more about the system software and security to ensure we have a firm understanding of software categories and security. To understand the network types and their uses. To understand about life chances eg the digital divide. To be able to understand what an algorithm is as it's integral to programming and to further develop our python programming skills.

What new **KNOWLEDGE** will I gain?

You will understand about LAN and WAN and the types of networks and their uses. You will expand your knowledge of legal and ethical issues such as the digital divide. You will learn about algorithms.

UNIT: Half Term 3

How does this build on the **KNOWLEDGE** I already have?

You will enhance and form a firm understanding of system software and security building on the last term. You will also build on your knowledge of ethical and legal issues by looking at the digital divide. You will finally continue to develop your python programming skills making code choices.

What new **SKILLS** will I develop?

You will learn about networks, how they work, and be able to identify, LAN, WAN, wired and wireless networks.
You will learn how to use your skills to reduce the digital divide.
You will be able to write algorithms for given tasks.

How does this build on the **SKILLS** I already have?

Currently the work has been standalone with independent storage. You will build on this by seeing how networks can share resources. You will build on ethical and legal skills by considering ways to bridge the digital divide. You will develop algorithms by building on your flowchart and IF statement knowledge.

GCSE Computer Science
Autumn: Learning Journey

UNIT: Half Term 4

What are we learning about?
In this unit of work we are going to look at:-
More on networks and algorithms.
You will continue with your programming techniques and you will revisit computational logic.

Why are we learning about it?
We are learning more about the networks as most computers are connected to other in some way. Algorithms are an important programming step and we further develop our skills by looking at sorting algorithms. There are more skills to learn in Python to improve our programming. We will revisit computational logic gates and truth tables to ensure a firm understanding.

What new **KNOWLEDGE** will I gain?
You will learn about different network topologies and you will learn about network protocols.
You will learn about sorting algorithms, for example bubble sort, merge sort etc.
You will learn about ways to improve your program in Python, for example functions.

How does this build on the **KNOWLEDGE** I already have?
The network knowledge builds on the previous term where we looked at wireless and wired networks.
We will build on the previous algorithms by looking at sorting techniques. Finally we will develop our programming by looking at functions.

What new **SKILLS** will I develop?
You will learn to identify which topology is best for which situation.
You will learn which sorting techniques are best for which situation.
You will learn how to use additional programming techniques to make better programs.

How does this build on the **SKILLS** I already have?
You learned about networks now you know about several topologies so you can now choose a suitable one. You learned about algorithms, now you know of different sorting methods so you are able to both pick one and perform the method.
You know how to program in Python but now using functions you can learn to reduce by reusing code.

GCSE Computer Science
Autumn: Learning Journey

UNIT: Half Term 5

What are we learning about?
In this unit of work we are going to look at:-
Final look at computer networks,
More on ethical and legal issues,
More practice with Algorithms,
Starting the NEA,
More on Computational Logic.

Why are we learning about it?
We are learning more about computer networks, looking at the protocols associated with internet connections.
We continue looking at ethical and legal issues where we look at environmental issues as we must protect the environment, and legal legislation to ensure we are safe.
We do some practice on algorithms and computational logic to ensure a firm understanding. We begin the NEA.

What new **KNOWLEDGE** will I gain?
You will understand how protocols are used for data transfer via the Internet.
You will learn about protecting the planet and legal issues associated with data.
You will learn about the NEA project.

How does this build on the **SKILLS** I already have?
The internet protocols work will develop the networking skills you have developed in half terms 3 and 4.
The recycling will develop the ethical and legal skills you have already covered in half terms 1 and 3.
The NEA will build on the programming skills you have developed so far in KS3 and in Half Terms 1 to 5 of GCSE.

What new **SKILLS** will I develop?
You will learn about how protocols transfer data on the Internet.
You will learn how to recycle electronic equipment and to protect the environment.
You will learn the skills to keep yourself safe and not break the law.
You will learn to interpret a client brief and use your programming skills for a set task.

How does this build on the **KNOWLEDGE** I already have?
The protocols work builds on the knowledge already covered by in the last two half terms on Networks. The recycling and saving the planet, along with legal legislation will build on your previous knowledge of legal and ethical issues.
The NEA will use much of the knowledge covered in half terms 1 to 5.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work we are going to look at:-
More on Algorithms,
More on Computational Logic,
More on binary,
Continue with the NEA.

Why are we learning about it?

The early part of the NEA consists of Algorithms and computational logic. Therefore, before starting, a review of these are done. The final part of binary, the binary shift and then hexadecimal is then completed. We continue the NEA as well.

What new **KNOWLEDGE** will I gain?

The new knowledge in this section is binary shift and hexadecimal. You also look at how to relate your knowledge to the NEA.

UNIT: Half Term 6

How does this build on the **KNOWLEDGE** I already have?

We have already looked at binary numbers, adding in binary, subtracting in binary, we now look at binary shift and hexadecimal.

What new **SKILLS** will I develop?

This Half Term and next is mainly looking at the NEA, however, you will learn two brand new skills:
How to do a binary shift to the left and the right, and how to convert from binary and denary to hexadecimal.

How does this build on the **SKILLS** I already have?

The binary builds on the previous binary units covered in half terms 1 and 2 where we looked at identifying binary numbers, adding and then subtracting using two's complement. The NEA builds on the NEA Introduction given at the end of Half Term 5 where we looked at addressing the client brief.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work we are going to look at:- Data Representation.
For the NEA:-
Ethical, Cultural and Legal issues,
Algorithms,
Programming.

Why are we learning about it?

We are practicing the new binary skills we learned in half term 6. The rest of this unit gives time for the NEA requiring the use of:-
Ethical, Cultural and Legal (covered in Half Terms 1, 3 and 5)
Algorithms (covered in 3, 4, 5, and 6)
Programming (covered in 1, 3, 4, 5 and 6)

What new **KNOWLEDGE** will I gain?

You look at how to relate your knowledge to the NEA.

UNIT: Half Term 7

How does this build on the **KNOWLEDGE** I already have?

This gives you the chance to think about what you have learned and use this knowledge to decide on the best skills needed.

What new **SKILLS** will I develop?

This unit deals with the NEA. It takes the skills that have been developed in Half Terms 1 to 6 and give you a chance to use those skills in a task based on a client brief.

How does this build on the **SKILLS** I already have?

The NEA builds on the NEA Introduction given at the end of Half Term 5 and developed in half term 6.

GCSE Computer Science
Autumn: Learning Journey

UNIT: Half Term 8

What are we learning about?

In this unit of work we are going to revisit:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural issues.

Why are we learning about it?

We are going to be revising Systems Architecture,
System Software and Security,
Computer Networking,
and Ethical, Legal and Cultural issues in preparation for the final external examination. We will be using the revision kits on the website and the books to enhance both knowledge and skills.

What new KNOWLEDGE will I gain?

This is a revision term, which covers:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural issues.
There is no new material to be covered, however, some students may have missed the odd lesson and so gain new knowledge as gaps are plugged.

How does this build on the KNOWLEDGE I already have?

This builds on the knowledge covered in Half Terms 1 to 7. It plugs gaps where students knowledge is weak. It re-caps to gain a better understanding of:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural issues.

What new SKILLS will I develop?

This is a revision unit. Necessary skills are covered and developed but no new skills are learned. It covers the skills learned in Half Terms 1 to 7.

How does this build on the SKILLS I already have?

This unit enhances the already covered skills and helps to develop and practice them. It focuses on:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural issues.

GCSE Computer Science
Autumn: Learning Journey

UNIT: Half Term 9

What are we learning about?

In this unit of work we are going to revisit:-
Algorithms,
Programming Techniques,
Computational Logic,
Data Representation.

Why are we learning about it?

We are going to be revising:-
Algorithms,
Programming Techniques,
Computational Logic,
and Data Representation in preparation for the final external examination. We will be using the revision kits on the website and the books to enhance both knowledge and skills.

What new KNOWLEDGE will I gain?

This is a revision term, which covers:-
Algorithms,
Programming Techniques,
Computational Logic,
Data Representation.
No new material will be covered, however, some students may have missed the odd lesson and so gain new knowledge as gaps are plugged.

How does this build on the KNOWLEDGE I already have?

This builds on the knowledge covered in Half Terms 1 to 7. It plugs gaps where students' knowledge is weak. It re-caps to gain a better understanding of:-
Algorithms,
Programming Techniques,
Computational Logic,
Data Representation.

What new SKILLS will I develop?

This is a revision unit. Necessary skills are covered and developed but no new skills are learned. It covers the skills learned in Half Terms 1 to 7.

How does this build on the SKILLS I already have?

This unit enhances the already covered skills and helps to develop and practice them. It focuses on:-
Algorithms,
Programming Techniques,
Computational Logic,
Data Representation.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work we are going to undertake a series of practice papers along with a new knowledge pass pack.

Why are we learning about it?

We are going to be revising:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural,
Algorithms,
Programming Techniques,
Computational Logic,
& Data Representation
using past exam papers, online papers and the pass pack.

What new **KNOWLEDGE** will I gain?

This is a revision and mock exam term, which covers:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural,
Algorithms,
Programming Techniques,
Computational Logic,
Data Representation.
No new material will be covered, however, some students may have missed the odd lesson and so gain new knowledge as gaps are plugged.

UNIT: Half Term 10

How does this build on the **KNOWLEDGE** I already have?

This builds on the knowledge covered in Half Terms 1 to 9. It plugs gaps where students' knowledge is weak.
It re-caps to gain a better understanding of:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural,
Algorithms,
Programming Techniques,
Computational Logic,
Data Representation.

What new **SKILLS** will I develop?

This is a revision unit. Necessary skills are covered and developed but no new skills are learned. It covers the skills learned in Half Terms 1 to 9.

How does this build on the **SKILLS** I already have?

This unit enhances the already covered skills and helps to develop and practice them. It focuses on:-
Systems Architecture,
System Software and Security,
Computer Networking,
Ethical, Legal and Cultural,
Algorithms,
Programming Techniques,
Computational Logic,
and Data Representation.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work you are going to look at:-

Binary

Denary

Hexadecimal

Adding

Two Compliment (Subtracting).

Binary Shift (left and right)

Why are we learning about it?

We are understanding how to count and calculation it binary as well as covert to and from denary and hexadecimal because all computers calculations are based on the binary system.

What new **KNOWLEDGE** will I gain?

You will learn how to add, subtract using twos compliment), multiply using binary shift and covert to denary and hex.

UNIT: Binary

How does this build on the **KNOWLEDGE** I already have?

This topic builds on the knowledge from Key Stage 3 that was covered in the computer unit, where we looked at how a computer system works.

What new **SKILLS** will I develop?

You will develop your ability to calculate in binary and covert binary numbers.

How does this build on the **SKILLS** I already have?

It builds on your skills of addition used in spreadsheets in KS3, database and python statements. It also has strong cross curricular links to maths.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work you are going to look at:-

What Python is

How to program in python to create a game or modelling system.

Why are we learning about it?

Programmers write programs in many different languages, one of the most widely used is Python. Sites such as YouTube are built on Python.

What new **KNOWLEDGE** will I gain?

You will learn how to write in Python to create a game using IF Statements, Loops, variables, modules and others features. You will learn how to save to a file.

UNIT: Python

How does this build on the **KNOWLEDGE** I already have?

This topic builds on the knowledge from Key Stage 3 that was covered in Python 1 and Python 2 where you learned programming.

What new **SKILLS** will I develop?

You will develop your ability to write in Python and to understand how to read python, fix issues and develop programs.

How does this build on the **SKILLS** I already have?

It builds on your skills of writing a program. You have already learned how to build basic programs at KS3.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work you are going to look at:-

A range of input devices

A range of Output device

A range of Storage devices.

Why are we learning about it?

We are learning about Input, Output and Storage because computers rely on user input, the ability to response with an out and the facility to keep the information safe for future reference in the form of storage.

What new **KNOWLEDGE** will I gain?

You will learn about the different types of storage and which is the most suitablee for which purpose. You will learn about some input and output devices you may not have been aware of. You will understand the term peripherals.

UNIT: Input, Output & Storage

How does this build on the **KNOWLEDGE** I already have?

This topic builds on the knowledge from Key Stage 3 in particular the computer unit.

What new **SKILLS** will I develop?

You will lean why different storage methods are best suited each task. You may also learn about some Input and Output devices you were not familiar with. You will also understand the term peripherals.

How does this build on the **SKILLS** I already have?

This course will develop your ability to both use and build computers. It will build on the computer unit by allowing you to identify and select appropriate hardware, software and storage media for relevant tasks.

GCSE Computer Science
Autumn: Learning Journey

UNIT: Boolean Logic

What are we learning about?

In this unit of work you are going to look at:-

What Boolean logic

What are Operators?

AND, NOT, OR, XOR

What are Logic Gates

Creating Truth Tables

Why are we learning about it?

We are learning about Boolean logic as computers as based on this. It helps us to understand how decisions are made. There are man operators but you will focus on AND, NOT, OR and XOR.

Logic gates are diagrams that help to show an understanding of decisions and truth tables show this in a table format.

What new KNOWLEDGE will I gain?

You will understand about four operators, AND, NOT, OR and XOR. You will understand the shapes used and how to produce logic gates. You will understand how to construct and use a truth table.

How does this build on the KNOWLEDGE I already have?

These topics will build on the knowledge from KS3 where you used the internet to find out information. It also builds on the computing unit where you learned how a computer works.

What new SKILLS will I develop?

You will understand how AND, NOT, OR and XOR works and will understand how to create logic gates and truth tables.

How does this build on the SKILLS I already have?

This course will develop your ability to go further than just basic searching in order to narrow down the searches for more relevant results. I looks at decision making building on previous diagrams in Control Systems and IF statements in Python.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work you are going to look at:-

Who John von Nuemann is.

What an ALU is

Memory

CPU Components

Volatile and Non-Volatile

Why are we learning about it?

We are learning about John von Neumann Architecture because computers are still based on the John von Neumann approach.

What new KNOWLEDGE will I gain?

You will learn who John von Neumann and who he is. You will learn about the different part of the CPU, ow memory works and what volatile and non-volatile is.

UNIT: John von Neumann Architecture and the CPU

How does this build on the SKILLS I already have?

This course will develop your understanding of John von Neumann's contribution to our technology. It builds on the computer unit from KS3 developing deeper knowledge.

What new SKILLS will I develop?

You will lean the four main parts of the CPU including the ALU. You will learn about the different stages of memory and which is volatile and which is non-volatile.

How does this build on the KNOWLEDGE I already have?

This topic builds on the knowledge from Key Stage 3 in particular the computer unit.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work you are going to look at:-

What is Pseudocode?

Loops

Selection

Calculations

and Conditions.

Why are we learning about it?

Programmers write programs based on a design. These designs can be done using a flowchart or a pseudocode. So it is important you understand what Pseudocode is.

What new **KNOWLEDGE** will I gain?

You will learn how to write in Pseudocode and learn how it differs from an actual programming language.

UNIT: Pseudocode

How does this build on the **KNOWLEDGE** I already have?

This topic builds on the knowledge from Key Stage 3 that was covered in Python 1 and Python 2 where you learned programming. It also builds on Control Systems where you learned how to do flow charts.

What new **SKILLS** will I develop?

You will develop your ability to write in Pseudocode and to understand how to read pseudocode.

How does this build on the **SKILLS** I already have?

It builds on your skills of designing a program. You have already learned how to design a program using a flowchart, now you will using pseudocode.

GCSE Computer Science
Autumn: Learning Journey

What are we learning about?

In this unit of work you are going to look at:-
The different types of Networks, wired wireless.
The Network Topologies,,
Bus, Ring, Star and Mesh
LANS, WANS and VPNS
Protocols including
FTP, TCP/IP, PoP
Packet and Data movement.

Why are we learning about it?

Most computers are now connect to a network in some way, be that via the internet or on a school or company connected network. You need to know how a network works in order to keep yourself safe.

What new **KNOWLEDGE** will I gain?

You will learn about a range of protocols, network topologies, types and data movements. You will understand the advantages and disadvantages of each.

UNIT: Networks

How does this build on the **KNOWLEDGE** I already have?

This topic builds on the knowledge from Key Stage 3 on how to connect PC's to the Internet or together which builds on the computer unit. This unit also builds on the safety and security unit where you need to be safe on line via a network using secure networks.

What new **SKILLS** will I develop?

You will develop your knowledge of how computers are connected together in order to share information as well as how to keep the data as secure as possible.

How does this build on the **SKILLS** I already have?

You have learned about being safe on line in Safety and Security and you have learned about building a computer in The Computer unit. This will unit looks at connecting the computers together.