



Dame Elizabeth
Cadbury School

Year 7 Foundations of Computing

Department Name: Computing

Year: 7

Unit Topic: Foundations of Computing

Composite Question: What do we mean by Computing?

Why this and why now? To understand the foundations of computing, how they work and what do we need to know. We cover this now as it is a great starting point to build upon what you should have covered in KS2 and 3 so far.

What am I Learning?	What do I need to know?	How will I be assessed?
1 What is the Censorship	Regulators control what people see online. There is more than one way to control what people see online. Different countries have different attitudes towards censorship.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
2 What is the function of computer hardware?	There are 4 main purposes for hardware. There are many reasons a computers performance may be affected.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
3 What is secondary storage and what are the advantages and disadvantages of the different types?	Secondary storage is important for long term permanent storage of data. There are 3 main types of secondary storage.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
4 What are the different types of software and what do they do?	We will look at the difference between bespoke and off the shelf software. There are pros and cons of the two to compare.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
5 How can we convert binary numbers into denary?	Binary is a number system which only uses two digits. We will convert from binary to denary and back again.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
6 How does the internet work?	To explain the difference between the internet and the WWW. To understand cloud storage and our use of it.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
7 What are the threats to a network?	We need to know how to keep safe when using devices. As soon as you connect a device to a network, such as the internet, you make it vulnerable.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
8 How can we protect against threats to the network?	We need to know how to keep safe when using devices. We will understand how firewalls, anti-malware and penetration testing can support us.	Interleaving questions. In lesson questioning. End of topic tests (MMA).



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Year 7 Foundations of Computing

Key Term	Definition	Key Term	Definition
URL	URL stands for Uniform Resource Locator, we sometimes call this a web address e.g. www.amazon.co.uk	Web Browser	A program that can read/access websites.
ISP	ISP stands for Internet Service Provider. This is a company that provides you with internet access (e.g. Virgin Media, Sky, Talk Talk).	Http	Http is a protocol (rule) and is used to load web pages using hypertext links.
Web Server	A web server is a computer that stores web server software and a website's component files (e.g. HTML documents, images and videos). A web server connects to the Internet and supports data interchange with other devices connected to the web.	Protocol	Protocol is a rule of how a computer can communicate over a network.
Censorship	It is the control or limitation of speech or public communication, conducted on the basis that the material is harmful, sensitive or offensive.	Hardware	The physical elements of a computer - anything you can touch.
Central Processing Unit	The processor is responsible for carrying out all instructions in a computer. It gets instructions from RAM, decodes them and then carries out them out.	Durable	Able to withstand wear, pressure, or damage; hard-wearing.
Software	Hardware is the physical parts of the computer and software is the programs that run on a computer.	Bespoke	Made for a particular customer or user.



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Year 7 Foundations of Computing

Denary	Denary is a number system it is also known as base 10 . There are ten choices of digits between 0 and 9.	Binary	Binary is a number system which only uses 1 and 0.
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Curriculum and Assessment Year 9 Python

Department Name: Computing

Year: 9

Unit Topic: Python Programming

Composite Question: How do variables and syntax allow us to program in Python?

Why this and why now? It will be useful to learn a text based programming language so you understand how programs are designed and created. This will build on the programming work in Year 7, when you used Kodu, which used block based programming. This will allow you to build on this introduction to Python if you choose to study the Computer Science GCSE.

What am I Learning?	What do I need to know?	How will I be assessed?
1 Outputs are how a computer communicates with a user. Error checking is important when programming.	Outputs are how a computer can send data back to the user. For example some text, an image or sound. A common output is to "print" text to a screen. Resilience is needed when error checking especially with Syntax and Name errors.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
2 Variables help us store data in a program to be used later on.	The equals symbol (=) is used to assign values to a variable. Variables must be given a meaningful name and should not be too long, variable names cannot contain a space. The values stored in a variable can change while the program is running.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
3 Inputs are how data is communicated between the user and the computer.	Inputs are the data a computer receives and can use in programs. The data/value inputted into the program are stored in a variable. The data can come in different forms e.g. signals from a sensor or text from a user.	Interleaving questions. In lesson questioning. End of topic tests (MMA).
4 Programming languages store data using different data types	The data type describes what the data is and how it can be used by the computer. The three main data types we will learn about are String (str), Integer (int) and Float (also known as Real).	Interleaving questions. In lesson questioning. End of topic tests (MMA).



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Curriculum and Assessment Year 9 Python

Key Term	Definition	Key Term	Definition
Name Error	An error when you try to use a variable or function (e.g. print or input), that doesn't exist or wasn't used in a valid way (misspelt).	Syntax Error	An error in the sequence of characters. Missing punctuation can be an example of this.
Variable	Variables are used to store pieces of data that might be needed later in the program. The data stored in the variable can change.	Constant	Constants can only be assigned values before the program starts running.
Input	Inputs are the data a computer receives and can use in programs.	Output	Outputs are how a computer can send data back to the user. A common output is to "print" text to a screen.
Casting	Casting is when you change the data type of a value.	String	A collection of characters, used to create longer bits of text in Python. E.g. "Hello World"
Integer	The Integer data type is for whole numbers only. E.g. 9	Float	The Float (also known as Real) data type is for decimal numbers only. E.g. 4.7



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Curriculum and Assessment Overview Autumn 1+2

Department Name: Computing

Year: 10

Unit Topic: Components of a Computer System

Composite Question: What are the components that make up a computer system?

Why this and why now? You need to understand what components make up a computer system and what their roles are. We need to understand how they work and communicate with each other. This will build on work that we have shared in KS3 lessons. This will allow us to understand how Networks will play a role in our computer systems.

What am I Learning?	What do I need to know?	How will I be assessed?
1 Computer Systems – the process of a computer is to take data, process it, then output it.	A computer system is made up of Hardware and Software that work together to process data/complete tasks.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
2 How Computer Legislation and Ethics can have a big impact on the use of technology.	The laws you need to understand are the Data Protection Act, The Computer Misuse Act and The Copyright Designs and Patents Act. We also need to be able to discuss the benefits and drawbacks of Open Source and Proprietary Software. The use of technology can raise all sorts of tricky issues, including ethical, cultural, privacy and environmental issues.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
3 The CPU is the main component of a computer.	Von Neumann architecture is one of the main types of CPU architecture. The CPU follows the Fetch-Execute Cycle. The CPU has three main parts these are The Control Unit (CU), The Arithmetic Logic Unit (ALU) and The Cache.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
4 Memory contains all of the instructions that the CPU follows.	RAM (Random Access Memory) and ROM (Read Only Memory) are main memory. Virtual Memory is Secondary Storage that can be used as extra RAM. Volatile Memory (RAM) means that this memory is temporary memory and requires power to retain data.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).



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Curriculum and Assessment Overview Autumn 1+2

<p>5 Python Programming Language - Introduction</p>	<p>Programming languages have five main data types of Integer, Float (Real), Boolean, Character and String. Casting is used to change data type. Basic Arithmetic Operators are straightforward maths functions. The three main programming constructs are Iteration, Sequence and Selection.</p>	<p>Programming projects. Interleaving questions. Practice exam questions. In lesson questioning.</p>
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Key Term	Definition	Key Term	Definition
Hardware	The physical parts of a computer system.	Software	Programs or applications that can be run on a computer system.
Embedded Systems	A computer built into another device, e.g. a Smart TV, Smart Watch or Washing Machine	Motherboard	The main circuit board in a computer that other hardware connects to.
CU	The Control Unit (CU) is the part of the CPU that controls the flow of the data.	ALU	The Arithmetic Logic Unit (ALU) is the part of the CPU that carries out arithmetic and Boolean operations.
The Cache	The Cache is quick access memory inside the CPU that stores the frequently used instructions.	Fetch-Execute Cycle	This is also known as the Fetch, Decode, Execute Cycle. Which will repeat the process of the CPU fetching an instruction, decoding it and executing the instruction.
RAM	Random Access Memory (RAM) is volatile memory. RAM is where all data, files and programs are stored while they are being used.	ROM	Read Only Memory (ROM) is non-volatile memory, meaning it is permanent memory and keeps its content even when it has no power. ROM can only be read, not written to. It stores all of the instructions a computer needs to boot up.



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Curriculum and Assessment Overview Autumn 1+2

Virtual Memory	Area of secondary storage used by the OS as extra RAM.	Ethics	Something which raises questions of right and wrong.
Open Source Software	Software that can be modified and shared by anyone.	Proprietary Software	Software where modifying and sharing is not permitted.



Curriculum and Assessment Overview Autumn 1+2

Department Name: Computing

Year: 10

Unit Topic: Networks

Composite Question: Most computers and devices are connected together via networks. This opens up new opportunities and advantages. What are the advantages?

Why this and why now? You need to understand how networks impact computer systems and what components contribute to a network and what their roles are. We need to understand how they work and communicate with each other. This will build on work that we have shared in KS3 lessons. This will allow us to understand how Networks will play a role in our computer systems (e.g. Hardware and Security).

What am I Learning?	What do I need to know?	How will I be assessed?
1 Why is Secondary Storage needed?	Secondary storage is data storage used to store data so that devices can be switched off. The three main types of secondary storage are magnetic, optical and solid state.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
2 What are network topologies?	A computer network is a number of computers linked together to allow them to share resources. Networked computers can share hardware, software and data. Two topologies of networks are Mesh and Star.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
3 How do Protocols support access to networks?	We will learn how IP addressing, MAC addressing and Protocols support the access to Networks. Key protocols are TCP/IP, HTTP, HTTPS, FTP, POP, IMAP and SMTP.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
4 What are layers and their role in networks?	We will learn the processes involved in packet switching to allow the sending and receiving of data/files. We will understand the roles of layers and how they impact the sending and receiving of packets.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
5 How does security affect our use of technology?	We will learn the different strategies that criminals use to attack computer networks and how we can minimise these. To minimise security threats we can improve software, education to users and physical security.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
6 Python Programming Language – Iterations	The three main programming constructs are Iteration, Sequence and Selection. We focus on the use of iterations, mainly While and For loops. We will also use arrays (lists) and manipulate these.	Programming projects. Interleaving questions. Practice exam questions. In lesson questioning.



Curriculum and Assessment Overview Autumn 1+2

Key Term	Definition	Key Term	Definition
Topologies	Topology defines the structure of the network of how all the components are interconnected to each other.	WIFI	WiFi is Wireless Frequency - radio waves are used to transmit data packets without the need for wires.
Mesh Network	Where some or all of the workstations or other devices are connected directly to each of other. Most are usually connected to the node that they exchange the most data with.	Star Network	In a star network, each device is connected by an individual cable directly to the server. Star networks are usually the layout of choice in schools and offices because they tend to be the most reliable of the topologies.
Encryption	Encryption is a method of scrambling data with a key code which makes no sense.	Protocols	Network protocols are a set of rules or conventions which control the communication between devices on a network.
IP Address	A unique string of numbers separated by full stops (e.g. 192.168.1.23) that identifies each network using the Internet Protocol to communicate over a network.	MAC Address	MAC addresses, or Media Access Control Addresses, uniquely identify a device on a network by identifying the network adapter that the device is using. This enables you to distinguish between different devices.
Layers	As a packet is prepared, the data travels through layers where protocols manage it, adding or removing extra information as required.	Packet Switching	When you break down a file into smaller chunks/packets.
Social Engineering	Social engineering is the term used for a broad range of malicious activities accomplished through human interactions. It uses psychological manipulation to trick users into making security mistakes or giving away sensitive information. Social engineering attacks happen in one or more steps.	Phishing	This is when fraudsters send emails claiming to be from a bank or e-commerce site (a website you can buy something from e.g. Amazon, PcWorld or Claire's accessories) in order to find out your personal and financial details.



Curriculum and Assessment Overview Autumn 1+2

Malware	Malicious software (malware) that is specifically designed to disrupt, damage, or gain unauthorized access to a computer system.	DDOS	A distributed denial-of-service (DDoS) attack is a malicious attempt to disrupt the normal traffic of a targeted server, service or network by overwhelming the target or its surrounding infrastructure with a flood of Internet traffic.
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Curriculum and Assessment Overview Autumn 1+2

Department Name: Computing

Year: 10

Unit Topic: Programming Task

Composite Question: How can I use a programming language to produce a product for an end user?

Why this and why now? You need to understand how programmers will produce a product for an end user. What techniques and planning may be used, as well as testing and refinement. This will build on work that we have completed in KS3 and KS4 lessons.

What am I Learning?	What do I need to know?	How will I be assessed?
1 Python Programming Language	Programming languages have five main data types of Integer, Float (Real), Boolean, Character and String. Casting is used to change data type. Basic Arithmetic Operators are straightforward maths functions. The three main programming constructs are Iteration, Sequence and Selection.	Programming projects. Interleaving questions. Practice exam questions. In lesson questioning.
2 Python Programming Language – Iterations	The three main programming constructs are Iteration, Sequence and Selection. We focus on the use of iterations, mainly While and For loops. We will also use arrays (lists) and manipulate these.	Programming projects. Interleaving questions. Practice exam questions. In lesson questioning.
3 How does security affect our use of technology?	We will learn the different strategies that criminals use to attack computer networks and how we can minimise these. To minimise security threats we can improve software, education to users and physical security.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
4 Programming/Translators	A translator can be used to convert words and symbols the programmer can remember and understand into the binary the computer needs to work with. The computer is simply keeping a list of what the codes are and labels for memory locations rather than the programmer having to do this them self.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
5 How do Protocols support access to networks?	We will learn how IP addressing, MAC addressing and Protocols support the access to Networks. Key protocols are TCP/IP, HTTP, HTTPS, FTP, POP, IMAP and SMTP.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).



Curriculum and Assessment Overview Autumn 1+2

Key Term	Definition	Key Term	Definition
Encryption	Encryption is a method of scrambling data with a key code which makes no sense.	Protocols	Network protocols are a set of rules or conventions which control the communication between devices on a network.
IP Address	A unique string of numbers separated by full stops (e.g. 192.168.1.23) that identifies each network using the Internet Protocol to communicate over a network.	MAC Address	MAC addresses, or Media Access Control Addresses, uniquely identify a device on a network by identifying the network adapter that the device is using. This enables you to distinguish between different devices.
Malware	Malicious software (malware) that is specifically designed to disrupt, damage, or gain unauthorized access to a computer system.	DDOS	A distributed denial-of-service (DDoS) attack is a malicious attempt to disrupt the normal traffic of a targeted server, service or network by overwhelming the target or its surrounding infrastructure with a flood of Internet traffic.
Low Level Language	A programming language that is close to what the CPU would actually work with. E.g. machine code.	High Level Language	A programming language that resembles a natural language.
Interpreter	A translator that turns the source code into machine code and runs it one instruction at a time (Python IDLE).	Compiler	Translation software that converts high-level source code into machine (object) code.
Source Code	The program written by the end user in a high-level language before it is converted to machine code.	Object Code	The machine code produced by a compiler.
Validation	Checking that an input meets a certain criteria.	Maintainability	A characteristic of defensive design that helps programmers modify and repair programs.
Iterative testing	Repeated testing of a program during the development process.	Final/terminal testing	Testing the whole program at the end of the development process.



Curriculum and Assessment Overview Autumn 1/2

Department Name: Computing

Year: 11

Unit Topic: Algorithms

Composite Question: How do we know our devices are secure?

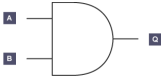
Why this and why now? This topic builds on the programming topics you completed in KS3 and Year 10. It will help us problem solve and build on our defensive design knowledge. This will lead onto supporting your understanding of Networks and Security.

What am I Learning?	What do I need to know?	How will I be assessed?
1 To understand that Algorithms are sets of instructions for solving a problem	What is Decomposition, abstraction and algorithmic thinking? Understand how search algorithms work and the difference between binary and linear search.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
2 Programming/Translators	A translator can be used to convert words and symbols the programmer can remember and understand into the binary the computer needs to work with. The computer is simply keeping a list of what the codes are and labels for memory locations rather than the programmer having to do this them self.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
3 Pseudocode should follow a similar structure to programming languages.	There are different ways to write pseudocode. It is not actual programming language and should clearly show an algorithms steps without worrying about the finer details (syntax) of any particular programming language.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
4 Defensive Design	When data is entered into a program it is important that it is valid in order for the program to operate correctly. Sometimes users will deliberately enter incorrect or 'spam' data in an attempt to access a program or the program code. We need to defend against this.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).



Curriculum and Assessment Overview Autumn 1/2

Key Term	Definition	Key Term	Definition
Decomposition	Breaking a problem down into smaller problems.	Abstraction	Picking out the important bits of information.
Algorithmic Thinking	Coming up with an algorithm to solve a problem.	Translator	A program that turns a programming language into machine code.
Low Level Language	A programming language that is close to what the CPU would actually work with. E.g. machine code.	High Level Language	A programming language that resembles a natural language.
Interpreter	A translator that turns the source code into machine code and runs it one instruction at a time (Python IDLE).	Compiler	Translation software that converts high-level source code into machine (object) code.
Source Code	The program written by the end user in a high-level language before it is converted to machine code.	Object Code	The machine code produced by a compiler.
Validation	Checking that an input meets a certain criteria.	Maintainability	A characteristic of defensive design that helps programmers modify and repair programs.
Iterative testing	Repeated testing of a program during the development process.	Final/terminal testing	Testing the whole program at the end of the development process.



Curriculum and Assessment Overview Autumn 1 +2

Department Name: Computing

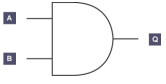
Year: 11

Unit Topic: Computational Thinking and Data Representation

Composite Question: What is meant by computational thinking?

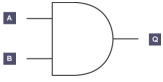
Why this and why now? This topic builds on the programming topics you completed in KS3 and Year 10. It will help us problem solve and build on our computational thinking knowledge. This will lead onto supporting your understanding of Pseudocode, search and sort algorithms.

What am I Learning?	What do I need to know?	How will I be assessed?
1 Pseudocode should follow a similar structure to programming languages.	There are different ways to write pseudocode. It is not actual programming language and should clearly show an algorithms steps without worrying about the finer details (syntax) of any particular programming language.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
2 To understand that Algorithms are sets of instructions for solving a problem	What is Decomposition, abstraction and algorithmic thinking? Understand how search algorithms work and the difference between binary and linear search.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
3 Computational Logic gates take binary information and give an output based on the Boolean operation.	Logic gates apply Boolean logic to inputs. There are three types of gates to understand, be able to draw the gate and truth table as well as understand the notation for the NOT, AND and OR gates.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).
4 Understand how Data Representation allows us to convert between different number systems and the use of binary with images and sound too.	How to convert Binary (Base 2), Denary (Base 10) and Hexadecimal (Base 16). Show working out and remember the correct methods. Understand how we would add binary to complete Binary Addition and be aware of what an overflow error is. Images and sound are pieces of data stored on computers and made up of bits.	Interleaving questions. Practice exam questions. In lesson questioning. End of topic tests (MMA).



Curriculum and Assessment Overview Autumn 1 +2





Curriculum and Assessment Overview Autumn 1 +2

Key Term	Definition	Key Term	Definition
Binary	A counting system using base-2 consisting of 0s and 1s.	Denary	A number system using base-10. Also known as decimal.
Hexadecimal	A counting system using base-16 consisting of the digits 0-9 and the letters A-F.	Overflow error	An error that occurs when the computer attempts to process a number that has too many bits for it to handle.
Decomposition	Breaking a problem down into smaller problems.	Abstraction	Picking out the important bits of information.
Algorithmic Thinking	Coming up with an algorithm to solve a problem.	Sampling	The process of converting analogue signals into digital data.
Pixels	Small dots that make up a bitmap image.	Amplitude	The height of the sound wave.
Colour Depth	The number of bits used for each pixel in an image file.	Sample Rate	How many samples of sound can be taken per second.
Metadata	Extra data stored in a file which gives information about the file's properties.	Compression	The process of making the size of a file smaller.