'Computing' **Curriculum Map**

Intent:
To enable students to be able to work effectively and competently with digital technology in a variety of forms. The use of technology is increasing as society develops and as our students move onto their adult lives an understanding and awareness of digital literacy will be key to them making effective citizens in a global society.

Intrinsic Subject Value

Having the ability to work with computers in a variety of ways is intrinsic to most areas of society and will increase in an ever technological society. Confidence to use digital technology competently will enable students to meet future demands. Safe use of all technology is essential in an evolving digital environment.

KS2 *'Subject'* Curriculum
Design, write and debug programs that accomplish goals, including controlling or simulating physical problems, solve problems by decomposition.
Use sequence, selection and repetition in programs; work with variables and various forms of input and output.
Use logical reasoning to explain how some simple algorithms work and detect and correct errors in algorithms and programs.
Understand Networks including the internet; how they can provide multiple services, such as www; and opportunities they offer for communication and collaboration. Use search technologies effectively, appreciate how results are selected and ranked, be discerning in evaluating digital content.
Select, use and combine a variety of software (including internet) on a range of digital devices and create programs that accomplish given goals. Use technology safely, respectfully and responsibly; recognise acceptable and unacceptable behaviour. Identify a range of ways to report concerns about content and contact.

'Subject' **themes that run through the curriculum**

Safety and Security
Algorithms and Logic
Creative Design and Development
Programming
Data and Process management (Inc. hardware/software etc.)

Year 7.1

Introduction to computing

Rationale:
Supportive transition from primary, introduction to schools network/ programs/ courtfields.net etc. Allows students to gain experience of a range of basic software and be able to make decisions about suitability for purpose that will be helpful across all subjects as will the work on internet search terms. Covers E-safety criteria with particular reference to social media and safe internet use.

Essential Knowledge
How to open a program.
How to navigate a file structure

Substantive Knowledge:
What is software?
What is each element of MO software? What is each one used for?
What is a file/folder? How do I create and structure folders/files etc.?
How do I search the internet effectively?
What is E-Safety?
How to appropriately target a specific audience?

Disciplinary Knowledge:
Introduction to school network- finding programs, setting up folders, courtfields.net.
MO programs- word, publisher, excel, PowerPoint- basic skills, program choice.
Creation of E-Safety presentation to set target audience to include images, embed videos etc.

Prior learning / retrieval:
Work relevant to our system- n/a
Basic program use- links back to KS2 software selection and using search tools effectively.

Links to KS3 NC:
Creative Project (multiple applications.)
Create, reuse, revive and repurpose digital artefacts for audience. (Researched content, videos etc.)
Understand using tech safely, recognise appropriate content. (e safety, target audience)

Disciplinary literacy:
Login, Programme, Software, Hardware, Structure, Security, E safety, Cyberbullying, Target Audience.

Summative assessment:
Opportunities for self and peer assessment throughout but mostly summative assessment of individual tasks (email etc.) and final piece.

Computational Thinking

Rationale:
Pupils will be introduced to adaptable skills, which are referred to as 'Computational Thinking'. By the end of this pupils will have developed several skills that are required for the problem-solving aspects of Computing. Pupils will look at what computational thinking is and how and when they can expect it to be applied in real life scenarios. Pupils will be introduced to Scratch and lead through several tasks which they will need to apply these newly developed skills to produce a successful game.

Essential Knowledge
Decomposition, Abstraction and Pattern Recognition in a Computing context.

Substantive Knowledge:
Decomposition – the process of breaking a large problem into smaller and more manageable chunks.
Abstraction – the ability to extract key information from a problem and ignore anything else that is not relevant.
Pattern recognition – spotting repeating patterns in a problem as a technique to solve a problem.
Algorithms – a set of instructions to solve a larger problem.

Disciplinary Knowledge:
Practice of Scratch – a block-based programming language that replicates the functions of text-based languages. Used to practice and apply the understanding of key computational thinking skills.

Practice of computational skills – applying the computational problem solving skills to a competitive challenge independently.

Prior learning / retrieval:

Links to KS3 NC:
- 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 how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

Disciplinary literacy:
Computational Thinking, Abstraction, Decomposition, Algorithms, Pattern Recognition

Summative assessment:

Animation

Rationale:
Introducing students to specific 'non general' software. Allowing students to experiment with creative uses for software and produce content to a brief. Looks at suitable planning processes. Gives students a basic introduction to how animated content is produced, also combining different types of files (sound etc.) together.

Essential Knowledge
Understand that animation is moving images
Know the difference between a frame and a key frame.

Substantive Knowledge:
How does a computer store moving images?
What impact does exporting my file in a different format have?
How do I create layers in my animation?
How do I use Pencil 3D effectively to create an animation?
What impact will use key frames and fps have on my animation?

Disciplinary Knowledge:
Using specific software to create a product which is for a set criteria and target audience.
Experimentation with tools and timings to produce realistic movement and clear communication of a 'story'.

Prior learning / retrieval:
Generalised link to KS2 curriculum in terms of software use but likely it is new software.
Planning and research skills can be carried forward from other units/ KS2- google searching etc.

Links to KS3 NC:
Creative project (use of Pencil 2D, set brief and target audience.)
Create, reuse, revive and repurpose digital artefacts for audience.
Understand using tech safely, recognise appropriate content.

Disciplinary literacy:
Timeline, Onion Skin, FPS (frames per second), Key Frame, Layers

Summative assessment:
Plickers quiz to check knowledge and understanding and to tackle misconceptions. Final assessment based on Greater Depth knowledge. Both used for feedback activity.

Year 7.2

Audacity

Rationale:
Opportunity to create using open source specific software and suitable hardware. Students get to experiment with software that can alter content (effects etc.) An introduction to music editing. Also allows students to look at exporting files in specific types and how computers store certain file types. Students also start to look at the legal side of using existing content.

Essential Knowledge
How to import a sound file.
To understand what a timeplan is.

Substantive Knowledge:
Tools to edit and manipulate sound files
Target audience
Planning tools for an edited piece of music
Legal issues surrounding the use of sound and music.
Downloading, importing and exporting files
The purpose of exporting files

Disciplinary Knowledge:
Using software to experiment with effects, creating an audio clip for a chosen purpose.

Prior learning / retrieval:
Generalised link to KS2 curriculum in terms of software use but likely it is new software. KS2 curriculum is not specific about whether or not students would be taught how to download/import and export but this may have been covered. Internet searching will have been covered at KS2 and also in earlier SoL in CF.

Links to KS3 NC:
Creative project- use of Audacity, set brief and target audience.
Create, reuse, revive and repurpose digital artefacts for audience. (importing sounds/ music)
Understand using tech safely, recognise appropriate content. (copyright and legal rights)

Disciplinary literacy:
Import, edit, effects, Download, Export, Timeplan

Summative assessment:
Plickers quiz to check knowledge and understanding and to tackle misconceptions.
Final assessment based on Greater Depth knowledge. Both used for feedback activity.

How Computers Work

Rationale:
Pupils will begin to be introduced to the architecture of common computing systems. They will study the process of users inputting data into a system; data being processed; the result being outputted by the computer. Pupils will study how this process relies on the different components of a computer and how they interact to achieve given goals. Pupils will study how computers represent data in binary including how they're used to represent 'human' denary numbers before being introduced to sorting algorithms.

Essential Knowledge
Understand the difference between hardware and software.
Understand the input-process- output model

Substantive Knowledge:
Input/output devices – used to input data from external data source into a computational device and output to an external data source once processed.

Process – for a computer to carry out a set of instructions on a piece or set of data.

Storage – the long-term storage of processed data.

Components – internal devices that carry out specific roles in the function of a computer.

Binary number system – a number system used by computers to represent all data.

Sorting – putting data into a specific order, usually ascending or descending.

Disciplinary Knowledge:

Binary to denary conversions – pupils will convert between binary and denary numbers to highlight the link between computers and humans representing data.

Identification and evaluation of key computer components on a motherboard.

Apply a sorting algorithm – order data into ascending or descending order through a learned sorting algorithm.

Prior learning / retrieval:

Links to KS3 NC:
- 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
- understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal
- 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;

Disciplinary literacy:
Input, Output, Sensor, Storage, Accessibility, Component, Bit, Binary, Denary, Sorting, Algorithms

Summative assessment:

Code.org Fundamentals

Rationale:
Pupils will begin to apply the Computational Thinking skills to a programming environment. The concepts of programming will be introduced in a block-based programming environment. This will give them a foundation of key theory and practise that pupils will be able to use as a building block as they move into textual-based programming. Students learn programming concepts, computational thinking, and develop problem-solving skills and persistence.

Essential Knowledge
Understand what sequencing, selection and iteration mean.

Substantive Knowledge:
Debugging – identifying and being able to fix problems that occur in an algorithm or a program.

Sequencing –understanding how instructions and commands are put into the correct order for a computer to read.

Selection – understanding how a computer can make a decision about which part of a program to run next. An understanding of how links to conditions.

Iteration – understanding when and how a computer would need to repeat an instruction and forming an understanding of how this can be implemented.

Function – a named group of programming instructions. Functions are reusable abstractions that reduce the complexity of writing and maintaining programs.

Disciplinary Knowledge:
Practice of block-based programming – pupils will apply this knowledge and implement it in a block-based language to solve virtual problems. By applying the knowledge they will be able to recognise the key programming constructs in use.

Identification and explanation of the impact of programming constructs on an algorithm.

Prior learning / retrieval:

Links to KS3 NC:
- 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 how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

Disciplinary literacy:
Algorithm, Bug, Debugging.
Sequencing, Loop, Repeat, Condition, Conditionals, Command, While Loop, Until, Function

Year 8.1

Programming in Python

Rationale:

Pupils will be introduced to a textual based programming language for the first time. They will spend coming to terms with the importance of syntax and the necessity for accuracy. Pupils will be introduced to variables and form an understanding of how they work and can be used to store data in programs. Pupils will continue to develop skills that allow them to use selection to alter the sequence a program operates in.

Essential Knowledge

Knowledge of python syntax.
Knowledge of variables and what that means.

Substantive Knowledge:

Sequencing – the order that instructions are inputted to a computer and the impact this has on the output.

Selection – understanding how a computer can make a decision about which part of a program to run next. An understanding of how links to conditions.

Variables – small pieces of memory that store data to be used or manipulated by a program.

Syntax – the structure and layout of a programming language, including the spelling of keywords and use of variable names.

Textual based programming languages – text based rather than block based.

Disciplinary Knowledge:

Practice of Python – a text based programming language which pupils will apply knowledge from the previous block-based languages and understand the importance of using accurate and correct syntax.

Use of variables – the ability to manage data within a computer program and the study of how we use these variables to interact with the program via inputs and manipulation.

Manipulation of sequence – using selection (and the correct Syntax) to modify a program using selection to gain different results.

Prior learning / retrieval:

Links to KS3 NC:

understanding how a computer can make a decision about which part of a program to run next. An understanding of how links to conditions.

understand how instructions are stored and executed within a computer system;

Disciplinary literacy: Print, IDE, Syntax, Variable, Sequence, Input, Selection

Summative assessment:

Bebras Challenge & Event Driven Programming

Rationale:

The first two weeks are spent practicing and competing in the Bebras Computational Thinking Challenge. It aims to identify the top talented computational thinkers in the country and to allow all pupils to apply these skills in a functional way. Pupils will be able to independently problem solve computational problems. Pupils will spend the final 3 weeks studying and applying skills relevant to event driving programming. Pupils will use the Python Turtle module to create visual artwork initially before moving on to creating basic arcade games utilising the visual aspect of the technology.

Essential Knowledge

Identify a count controlled loop and a sub-program in a piece of code.

Substantive Knowledge:

Decomposition – the process of breaking a large problem into smaller and more manageable chunks.

Abstraction – the ability to extract key information from a problem and ignore anything else that is not relevant.

Pattern recognition – spotting repeating patterns in a problem as a technique to solve a problem.

Algorithms – a set of instructions to solve a larger problem.

Repetition/iteration – looking at how these can be introduced into a computer program to achieve part of a sequence to repeat a fixed number of times.

Sub programs – a program within a program that can be called to make a program simpler.

Disciplinary Knowledge:

Practice of computational skills – applying the computational problem solving skills to a competitive challenge independently.

Modelling a physical system – using count controlled for-loops to manage repetition of code and change sequences to program the physical Python turtle interface. Understanding of how these changes can be used to achieve a result.

Modifying events to deliver a desired outcome - changing pre-programmed events through computational thinking to deliver an outcome and use sub-programs to learn how their coding can be simplified.

Prior learning / retrieval:

Links to KS3 NC:

design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems

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 how instructions are stored and executed within a computer system;

Disciplinary literacy:

Problem Solving, Python Turtle, Instructions, Properties, For-loops, functions, Listen and onkey functions, Coordinates

Summative assessment:

Control & Logic

Rationale:

Pupils will be introduced to the notion that computers follow instructions that are triggered by certain events. By the end of this SoL pupils will understand how to express instructions in a flowchart along with selection of different parts of a program and the importance of sequencing these instructions. Pupils will develop a complete control solution to a problem using a flowchart-based language which utilises iteration.

Essential Knowledge

Know and understand the shapes of a flowchart.
Justify and define the importance of sequencing.

Substantive Knowledge:

Sequencing – the order that instructions are inputted to a computer and the impact this has on the output.

Repetition/iteration – an instruction will iterate if a certain condition has been met.

Selection – understanding how a computer can make a decision about which part of a program to run next. An understanding of how links to conditions.

Flowcharts – understanding the meanings of different shapes when using flowcharts to write algorithms.

Disciplinary Knowledge:

Flowcharts – using flowcharts to represent common algorithms correctly. Algorithms will be expressed correctly and accurately based on scenarios given using selection, sequencing and iteration where appropriate.

Development of a control system – the application of flowcharting to operate abstractions of real systems accurately. An understanding of how the parts of these systems interact with each other.

Ability to sequence instructions to reach a desired outcome when designing computer systems.

Prior learning / retrieval:

Links to KS3 NC:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- 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

Disciplinary literacy: Sequencing, Instructions, Selection/Decisions, Flowcharts

Summative assessment:

Year 8.2

Website Design

Rationale:
The WWW is becoming more and more the place for people to shop, work, research, communicate etc. Pupils will be able to understand end gain experience in creating their own web sites, seeing how software links images, text etc. together. They will also be able to experience seeing how changes made to html/css coding can affect the visual outcome and therefore make more links between what they write as a program and what they see on the screen.

Essential Knowledge
Awareness of what a master page is.
Understanding of legal and ethical issues surrounding non original content.

Substantive Knowledge:
- What is a master page?
- How do I build a web page using code as well as the design view?
- What are the legal issues surrounding using other peoples content on my webpage?
- How do I create for a given customer and specific use?
- What makes a website effective?
- How do I import multimedia products?
- How do I create a navigation system?

Disciplinary Knowledge:
Using specific software to create a functional outcome- multipage website so use of navigation bars etc. Adding multimedia content to pages, master page use. Knowledge of legal issues surrounding use of other peoples work when published. Understanding design terms such as white/ negative space, house style etc.

Prior learning / retrieval:
Generalised link to KS2 curriculum in terms of software use but likely it is new software. Planning and research skills can be carried forward from other units/ KS2- google searching etc.

Links to KS3 NC:
Creative projects, using 2 or more programming languages, combining multiple applications, meeting needs of users, reuse and repurpose digital artefacts, using technology safely, recognising inappropriate content.

Disciplinary literacy:
Purpose, Target Audience, Features, Accessibility, Wireframe, Navigation Plan, Visualisation Diagram, Copyright, Function, House Style, Master Page, Multimedia.

Summative assessment:
Plickers quiz to check knowledge and understanding and to tackle misconceptions. Final assessment based on Greater Depth knowledge. Both used for feedback activity.

Photo Editing

Rationale:
Photo editing is a common practise both in industry and in more personal settings, the use of filters, 'photo shopping' etc. all give an 'edited' view of the world. Understanding and being better able to identify editing techniques has multiple purposes, firstly students are more able to identify what is real but also they are able to understand the legalities and moral issues surrounding it whilst also being able to edit their own photos to improve or adjust them.

Essential Knowledge
How to import and layer an image

Substantive Knowledge:
- How can I edit images using tools and filters?
- What are the moral implications of publishing edited photos?
- The role of layers to combine images together.
- What file types are appropriate for digital images?

Disciplinary Knowledge:
Using specific software to experiment with filters and effects to change outcome. Using tools to edit, blend and create realistic final products. Can edit photos with an awareness of proportion and realism.

Prior learning / retrieval:
Generalised link to KS2 curriculum in terms of software use but likely it is new software. Planning and research skills can be carried forward from other units/ KS2- google searching etc.

Links to KS3 NC:
Creative projects, using and combining applications, re using and re purposing digital artefacts, using technology safely and responsibly, protecting privacy, recognising inappropriate conduct.

Disciplinary literacy:
'Photoshopping', Data Protection, Ethical, Effects, Filter, Noise, Blur, Distort, Edit, Layer, Preview, Realistic, Proportion, Permission.

Summative assessment:
Plickers quiz to check knowledge and understanding and to tackle misconceptions. Final assessment based on Greater Depth knowledge. Both used for feedback activity.

Year 9.1

Artificial Intelligence

Rationale:

Pupils will be introduced to machine learning as a concept. By the end of this SoL pupils will understand how computers can be trained to recognise different data types and scenarios. Pupils will look at how computers can analyse large data sets and then use these to make recommendations based on mistakes and corrections that have been made when analysing this data. An emphasis on how computers can be trained to make decisions and the basic learning algorithms behind this. The ethical considerations of applying artificial intelligence will also be considered.

Essential Knowledge

How computers are trained to make decisions without human input.

Substantive Knowledge:

Machine Learning - computers learn using training models which can then be used to make decisions independent of human input.
Supervised learning algorithm - is a machine learning approach that's defined by its use of labelled training data to accurately identify data.
Unsupervised learning algorithm - uses machine learning algorithms to analyse and cluster unlabelled training data. These algorithms discover hidden patterns in data without the need for human intervention (hence, they are "unsupervised").
Ethics & bias – how they occur in automated computer systems from human input.
Training models – sets of data that are used to train a computer to make independent decisions.

Disciplinary Knowledge:

Development and testing of accuracy of training models –create their own data sets and then understand how to test these and how they can make the decisions more accurate.
Development of real-life systems – use supervised learning algorithms to emulate real-life decision-making computer systems.
Recognising and evaluating the impact of bias – an understanding of how human bias can infiltrate automated systems and being able to evaluate the societal impact.
Justification of the use of big data in a technological setting for both positive and negative.

Prior learning / retrieval:

Links to KS3 NC:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
- 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
- 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

Disciplinary literacy: Artificial Intelligence, Big data, Machine learning, Supervised learning, Unsupervised learning, Model, Natural Language Processing, Chatbot, Turing Test, Filter bubble, Recommendation, Ethics, Bias

Cyber Security

Rationale:

Pupils will be introduced to key cybersecurity and social engineering threats within computers and networks during this unit of work. By the end of this SoL pupils will have developed an understanding of how their data is collected as they use and browse the internet. This will develop into how this data must be protected under the Data Protection Act and the implications of legal implications of using computers for illegal activities. Pupils will be introduced to specific examples of cyberthreat including both malware and social engineering. They will also learn methods of prevention and be able to select these when appropriate.

Essential Knowledge

The difference between information and data.
The purpose and function of the Computer Misuse Act and Data Protection Act.

Substantive Knowledge:

Data – raw and unprocessed figures
Information – data with context and meaning
Data Protection Act – legislation around the use and management of data
Social engineering – cyber-attacks focusing on humans manipulating other humans into giving away personal information for a malicious purpose.
Hacking – unauthorised access to a computer system
Malware – examples of malicious software
Prevention methods – ways in which cyber-attacks can be prevented / mitigated.

Disciplinary Knowledge:

Recognition of legal and social implications of cyberattacks.
Describe how suitable methods of prevention can be used to mitigate cyber security threats.
Embedding of case studies to show an understanding of societal impacts of cyber security issues.
Describing in technical detail how a cyberattack operates and the possible damage it could cause.

Prior learning / retrieval:

Links to KS3 NC:

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 concern

Disciplinary literacy: Data, Information, User profiling, Data Protection Act, social engineering, phishing, blagging, shouldering, hacking, penetration testing, brute force attacks, Dos/DDoS, Computer Misuse Act, Ransomware, malware, viruses, Trojans, worms, adware, spyware, bots, anti malware, firewall, authentication, permissions, biometrics, two-factor authentication, CAPTCHA

Data Representation

Rationale:

Pupils will be introduced to data representation systems within computers during this unit of work. By the end of this SoL pupils will have developed an understanding of how data is collected from the world and then used to make recommendations, this will include needing to make decisions around the best ways to represent data. Pupils will be introduced to binary being a representation of data that computers use. Pupils will then go onto explore how 'human' data is represented using binary, including ASCII text and images.

Essential Knowledge

Understands the difference between encoding and decoding.
An understanding of why computers use a binary (on/off) system.

Substantive Knowledge:

Binary number system – two-digit number system and how they utilised by a computer in comparison to denary number system.
Encoding & decoding – the process of converting analogue data into digital data for a computer to understand and vice versa.
Encryption & decryption – scrambling data up for secure transmission to prevent unauthorised access.
Security measures – digital and physical methods to keep computers safe from cyber-attacks.

Disciplinary Knowledge:

Processing data via a binary number system – to be able to encode characters, images and numbers so that they can be understood by a computer system or decoded to be understood by a human.
Developing and applying encryption techniques – to be able to use knowledge of what makes a successful encryption algorithm to develop a set of rules to securely transmit data over a network.
Recognition & practice of representing information – data + context = information.
Implement security measures – digital and physical methods are actively utilised to keep data safe and secure.

Prior learning / retrieval:

Links to KS3 NC:

understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]

understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

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

Disciplinary literacy: Data, representations, encode, decode, encrypt, decrypt, ASCII, binary, bit, pixel

Summative assessment:

Year 9.2		***App Design & Development*** **Rationale:** Pupils will be introduced to app design and implementation during this unit of work. By the end of this SoL pupils will have developed an understanding of what apps are, how they are composed and the process of designing professional applications. This will include the purpose and methods of navigation, the use of interaction and an understanding of how IDEs are used to program features. Pupils will design an application for use by the school including justifying why they have made the appropriate design decisions. Pupils will then have an opportunity to develop and program the app using skills developed during this unit. **Essential Knowledge** Knowledge of what an application is. How to navigate an app- methods of. **Substantive Knowledge:** Integrated Development Environment (IDE) – a piece of software used to develop an application. The operation, uses and application of such software. Application – the key components that form an application including the code and the interface for control and navigation. Objects – items that be coded for a function such as images and buttons. **Disciplinary Knowledge:** Practice of using an IDE - create a functional mobile phone application from a given brief to meet a requirement. Implement applications with effective navigation and interface control – apply principles of navigation to a design of their own based on a brief. Apply basic coding principles to objects within an application – Implement an application which utilises interactivity from programmed objects. Use of images and other multimedia – effectively chosen and included within a piece of software that has been taken from the design phase. **Prior learning / retrieval:** **Links to KS3 NC:** • 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 the hardware and software components that make up computer systems, and how they communicate with one another and with other systems • 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 **Disciplinary literacy:** App, formatting, application, user interface, interactive, IDE, buttons, navigation, **Summative assessment:**	**Idea** **Rationale:** By the end of year 9 students should be capable of working independently with computers in a range of fields. Ideas is a nationally recognised qualification (if silver award) which is gained by students working on badges covering topics across all aspects of computing. Students can pick which badges to complete, enabling them to work on their preferred topics. **Essential Knowledge** Knowledge across the field of digital literacy. Awareness of impact of digital technology within the workplace. **Substantive Knowledge:** How do I write/ edit code? How do I use algorithms to solve problems? How do computers think? What do the individual parts of a computer do? How are computers used to communicate? How do aspects of the virtual world work (bitcoin etc..) How do I solve problems using software? How effective are existing solutions? How can I stay safe? How ethical are some aspects of virtual society? **Disciplinary Knowledge:** Students will learn/ retrieve a wide range of computer skills and knowledge to gain their award, the badges cover all aspects of digital learning but they don't have to do every badge so the skills they utilise will vary. All students will also learn/ utilise skills in time planning (not all badges allow to save part way through) and independence/ research skills. **Prior learning / retrieval:** The idea badges are broken down into 4 main sections, citizen, maker, worker and entrepreneur, they cover all areas of computing and therefore everything from the KS3 and 2 curriculum would be utilised to gain badges. **Links to KS3 NC:** Links to all aspects of KS3 curriculum. Students have to collect points in each area so all aspects are covered, students can focus more on one section so some areas may be covered in more detail than others. **Disciplinary literacy:** Independence, National Qualification, Badge, Award, Citizen, Maker, Worker, Entrepreneur. **Summative assessment:** iDea badges can be monitored through the website, giving staff a breakdown of how long has been spent, how many badges awarded and progress made. This will be used alongside classroom support to monitor progress.