

Year 9 ←

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<b>Topic Title</b>	<b>Revisit prior learning: File management, Online Safety and Binary</b>	<b>Hexadecimal and Compression</b>	<b>Creating a Comic</b>	<b>Python</b>	<b>Extended Spreadsheet Project</b>	<b>Logic and The impact of Computing</b>
<b>Rationale</b>	At the beginning of the academic year it is important to revisit the rules for the Computing rooms and the AUP. Learners check their file management and set up their folder structure for the year. Returning to Online Safety, learners will complete work around the topic of 'selfies'; using information from CEOP and ThinkYouKnow; year 9 will be guided to make informed choices when taking/sharing selfies using social media. Learners will return to Binary numbers and look at the topic from a machine level with 1/0 being on/off state, this leads to ASCII code where learners will explore the need for a code to be used for transferring data electronically; they will also explore how data can be compressed. Finally, learners will learn about the ancient art of cryptography and how this has developed within computing.	Continuing on from the recap on binary, learners will start to look at Hexadecimal as an example of another number system used inside computers. They will learn why and how we use Hexadecimal, and how to convert to hex from either binary or denary. Learners will also be looking at how and why files are compressed inside computers. They will focus on general compression methods at first, lossy and lossless, before moving on to specifics on how we store and compress images and sound inside computer. This will be linked to real world examples, where students must choose a compression method and justify their choice.	Using the comic life software, students will create a comic for a given scenario relating to online safety. A story board will be created to plan the comic before using the software to create graphics and complete the project. Scripts, elements and photos will be created to add to either a template or using a blank canvas which could be used to stretch students further.	Learners will be advancing their knowledge of textual programming languages by reviewing and continuing their work on python (started in year 8). Learners will recap the methods used to find and fix bugs. Learners will also be coding python statements to allow the computer to make more advanced decisions and iterate through code. Learners will finish with a python project that will bring together the knowledge learned over year 8 and 9, coding a program to solve one of several available problems. There is also an element of structured planning, introducing common project planning methodologies such as Waterfall and Agile.	Learners are presented with a vocational scenario, they will explore the use of spreadsheets which leads to the design and creation of a multi-page model. Initially learners should be given a sample spreadsheet where they identify and describe the features which have been used, explaining how they improve the accuracy and usability of the spreadsheet. Working within the same scenario, learners will be given the client brief; they are required to design the spreadsheet using a range of features. The task will allow for the most simple of spreadsheet formula and functions to perform calculations, graphs and charts to present information, validation rules to improve accuracy and formatting features for presentation; more able learners will use LOOKUP tables.	Learners will be reviewing logical operators and how they can be modelled using logic circuits. This will link, in depth, to the physical functions of circuits inside the computer. Learners will be analysing the impact of computers on the workplace and wider society. This will include the impact of computing on social and business environments, but also environmental impacts.
<b>Prior knowledge</b>	Although no prior knowledge is required for file management and ESafety, some knowledge binary would be advantageous.	Knowledge of binary is required for this topic, the learners will be revisiting this as part of the introduction to year 9 in the previous block. Some knowledge of how sound travels as a wave would be advantageous.	Having prior knowledge of comic layouts would be advantageous as well as the purpose of a comic.	Prior knowledge of python gained in year 8, sequencing and the basic use of decision and iteration in coding.	Learners would benefit from basic spreadsheet experience, entering data, formatting and creating formula.	This topic will be building on the learners knowledge of binary numbers and how they can be applied in logic circuits.
<b>Key knowledge/skills development</b>	Learners should now be competent with their file management therefore enabling them to work efficiently. They will deepen their knowledge of binary and look at how it is used in the context of computing.	Learners should now understand that we are not limited to just binary and denary in computer and that other number systems exist and can be used. Learners will understand the difference between Lossy and Lossless compression, along with the advantages and disadvantages to both. Learners will also be introduced to the method behind simple compression, how the computer actually makes files smaller.	This unit of work will introduce learning to the process of creating a comic using the comic life software to meet the needs of a specific audience and purpose.	Learners will be introduced to more complicated scenarios that they will need to fix through programming, they will build their confidence with python by producing projects that will more closely resemble commercially available products. Learners will begin to look at structured planning methodologies and why they are important for planning projects and mitigating the risks that are inherent in large scale projects.	Learners will increase their confidence of using spreadsheets, they will be able to construct formula using the correct operators, they will understand how the use of spreadsheets increases their accuracy and productivity and how to carry out challenging formulas and functions	Learners will expand on their current knowledge of binary to use logical operators in logic circuits. By the end of this topic learners should be confident in using basic logic, And, Or and Not, along with more complicated logic, Xor, Nand and Nor. Learners should be able to hold high level classroom discussions on the impact of computing on society and produce well-reasoned answers to specific questions on the impact of computing.
<b>National Curriculum/ specification links</b>	Understands how bit patterns represent numbers and images; understands the relationship between resolution and colour depth, including the effect on file size.	Understand how various data types (such as sound and images) can be represented and manipulated digitally. By understanding the use of hexadecimal, learners should have a better understanding of how different hardware and software components within the computer communicate with each other.	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	Using 2 or more programming languages, at least one that is textual. Using data structures in programming. Designing, planning and developing modular programs that use objects or functions.	Collecting and analysing data, creates digital content by combining software applications and internet services. Makes judgments about data, perform formula and functions	Understanding simple Boolean logic and its uses in circuits and programming. Their work on the impact of computing will link to the KS4 curriculum that, those who have chosen to take computing at ks4, will be undertaking.
<b>Literacy</b>	Writing scripts that represent mock online safety PSA's. Writing mock emails offering advice with dealing with the repercussions of sending inappropriate selfies.	Explaining the method of compression, both written and as part of a classroom discussion.	Writing scripts that, together with the visuals, represent a chosen scenario.	The use of documentation in planning and developing computer programs.	Why is a cell called a cell? Syntax used in spreadsheets has different rules to grammar but has a similar concept to the word used in English.	Coherently stating the impact of computing on the wider world, justifying their answers.
<b>Numeracy</b>	Cryptography. Recapping Binary.	Introducing the Hexadecimal number system. Converting analogue data (sound waves) to digital representations, through the use of sampling (represented through graphs).	Storyboard in numerical order, sequencing events (time)	Comparing operators.	Use of formula within excel to combine and represent data. Creation of graphs and charts.	Boolean logic and its use on binary values.
<b>STEM</b>	Understanding and following rules for safe working conditions. Using office software in both an individual and group context.	Analysing situations that require compression and suggesting a solution that will fulfil those requirements.	Creatively representing scenarios through the use of a sequence of images.	Analysing problems, planning and creating computational solutions. Critical analysis of existing programs and how they could be improved.	Critical analysis of existing spreadsheets. Creative additions to improve usability within the client brief.	Analysing the problems created by computing in society and suggesting creative solutions that could help to solve these issues.
<b>Cross curricular links</b>	Binary has links with what is learnt in Maths, the ESafety curriculum links with PSHCE in terms of keeping safe and being responsible citizens.	Hexadecimal links to the use of number systems (other than base-10) in maths. There are also links to maths in the storing of images, pixels are represented using co-ordinates on a graph. Storing sound links to the study of waves in physics.	Writing a storyboard will have links with English. Creating characters and digital graphics will link technology and art	Links to maths with the comparison of operators and use of sequences in iteration.	Working with numerical data has links with Maths	Links to circuits in physics and Boolean logic in maths.
<b>Key vocabulary</b>	ASCII, lossy, lossless, compressions	Hexadecimal, Binary, Denary, Lossy Compression, Lossless Compression	Template, panel layout, script, user interface, element wall,	Objects, Functions, Operators, Waterfall, Agile, Variables	Formula, function, format, validate, LOOKUP, Macro, absolute	AND, OR, NOT, NAND, NOR, XOR, XNOR, Logic Gates, Boolean