Computing Curriculum Justification – Year 8

The curriculum is designed to cover 5 topics throughout the year. The topics will cover 7 lessons per topic which is 35 sessions throughout the year. This will allow time to complete end of term Summative Assessments based on learning that has already taken place.

	Year 8	Topic 1 ½ Term 1	Topic 2 ½ Term 2 - 3	Topic 3 ½ Term 3-4	Topic 4 ½ Term 4-5	Topic 5 ½ Term 5-6
Computing	**Topic** Big Idea/Question	**Computing Systems** **Strands Undertaken:** IT Digital Literacy	**Artificial Intelligence** **Strands Undertaken:** IT Digital Literacy	**Representation from clay to silicon** **Strands Undertaken:** IT Digital Literacy Computer Science	**Animations** **Strands Undertaken:** IT Digital Literacy	**Python – Text based coding** **Strands Undertaken:** IT Digital Literacy Computer Science
	Software to be used	PowerPoint Word **Internet**	PowerPoint Word **Internet**	PowerPoint Word **Internet**	PowerPoint Word **Internet** **Blender** **Adobe Products**	PowerPoint Word **Internet** **Trinket** **Code Editor**
	Why this and why now? What is the content doing here? How does it integrate to prior learning or prepare students for future learning? Is it an opportunity for cumulative learning or to achieve proficiencies?	The unit is an example of new knowledge. There are, however, links to Year 7 learning on networks, which students will require to support their progress with this component. **This unit provides students with knowledge that is important to accessing and retrieving learning on representation that is**	The unit assumes no prior knowledge. There are, however, links to the 'Animation' unit taught in Years 8 as part of the spiralled curriculum. **This unit develops skills and knowledge that will be used in the following topics:** **This unit develops skills from previous units:** **NA**	This unit of work retrieves and builds hierarchically on from computing systems from half term 1 as well as block programming in scratch from Year 7 as part of ongoing retrieval. **This topic also needs to be taught before the use of programming languages in topic 3 and 4** **This unit develops skills from previous units:**	The unit assumes no prior knowledge. There are, however, links to the 'Vector Graphics' unit taught in Years 8 as part of the spiralled curriculum. **This unit develops skills from previous units:** ○ **Y8 – Design Vector Graphics** **This unit develops skills and knowledge that will**	This is the third programming unit to retrieve and build on prior Year 8 learning whilst introducing students to python to build on, apply, and challenge earlier learning. There is a second unit of work covered in year 9 as part of the spiralled curriculum. **This unit develops skills from previous units:** ○ **Y7 – Networks**

	Does it provide a step to collective sufficiency?	**taught later in the key stage.** **This unit develops skills from previous units:** ○ **Y7 – Networks** ○ **Y7 – Data Modelling** **This unit develops skills and knowledge that will be used in the following topics:** ○ **Y8 – Representations** ○ **Y8 - Python** ○ **Y9 – Cybersecurity** ○ **Y9 – Data Science** ○ **Y9 - AI** ○ **Y9 – Representations** ○ **Y9 – Python**	**This unit develops skills and knowledge that will be used in the following topics:** **Y8 – Animations** **Y8 – Representations** **Y9 - Representations**	○ **Y7 – Networks** ○ **Y7 – Data Modelling** ○ **Y8 – Computing Systems** **This unit develops skills and knowledge that will be used in the following topics:** ○ **Y8 - Python** ○ **Y9 – Cybersecurity** ○ **Y9 – Data Science** ○ **Y9 - AI** ○ **Y9 – Representations** ○ **Y9 – Python**	**be used in the following topics:** **NA**	○ **Y7 – Data Modelling** ○ **Y8 – Computing Systems** ○ **Y8 - Representations** **This unit develops skills and knowledge that will be used in the following topics:** ○ **Y9 – Cybersecurity** ○ **Y9 – Data Science** ○ **Y9 - AI** ○ **Y9 – Representations** ○ **Y9 – Python**
	What is the essential knowledge that needs to be remembered? What are the key facts, skills, and experiences that you want students to remember? What are the substantive and disciplinary concepts? Does the knowledge selected mean students leave with a good understanding?	Learners will be able to identify many aspects of a computing system. This will include: • Operating Systems; • Hardware; • Software; • Processor; • Memory; • Storage, • Input & Output, • Communication Components; • Logic; Circuits; • Artificial Intelligence. Learners will be able to explain the operation of each aspect.	**Learners will be able to**: Identify aspects of AI and how it impacts on computing and in real life. • Identify what AI is? • Understand how algorithms work. • Understand the potential benefits to society. • Identify and understand AI principles. • Understand the concept of machine learning including the **Decision Tree.**	Learners will be able to • Know and understand the history of computing and how we have developed modern computing systems. • Encode, transmit, and decode short messages, • Understand Binary digits and how they are represented in computing systems. • Identify Binary – Hexadecimal – Denary – Ascii and be able to convert each	Learners will be able to: Use the software to do the following: • Move • Rotate • Scale • Colour And create a simple scene. • Create motion by adding, modifying and deleting key frames • Extrude and loop cut • Editing using tools • Use lighting and rendering	Learners will be able to • Displaying messages. • Assigning values to variables, and receiving input from the keyboard. • Identify algorithms and write algorithms to perform an output. • Use arithmetic expressions and receive numerical input from the keyboard. • Construct short programs involving an input and an output.

	Substantive – key facts Disciplinary- Methods of subjects Procedural- Skills	Learners will be able to identify the connectivity of each aspect		• Adding and subtracting binary digits • Understand representation size, such as 'kilo-,' 'mega-,' 'giga-' and 'tera-	• Create a short video using all skills learned.	• Understand the difference between integers and string • Build programs that use conditions and iteration,
	What is the assessment intent and how will you assess? What types of assessments and question stems are being used to demonstrate students are learning and progressing to produce ever higher standards of work? What formative assessment is there for component learning and summative for composite learning?	Ongoing formative assessment to include questioning, peer and self-assessment, mini quizzes plenaries and use of mini WB etc to check for misconceptions and inform learning. Summative assessment will take place at the end of the unit of work based on topics learned. Assessments will be holistic to include learning from previous components to interrupt the forgetting curve as well as provide opportunities for development feedback. There will be a Termly Summative Assessment in line with school policy.	Ongoing formative assessment to include questioning, peer and self-assessment, mini quizzes plenaries and use of mini WB etc to check for misconceptions and inform learning. Summative assessment will take place at the end of the unit of work based on topics learned. Assessments will be holistic to include learning from previous components to interrupt the forgetting curve as well as provide opportunities for development feedback. There will be a Termly Summative Assessment in line with school policy	Ongoing formative assessment to include questioning, peer and self-assessment, mini quizzes plenaries and use of mini WB etc to check for misconceptions and inform learning. Summative assessment will take place at the end of the unit of work based on topics learned. Assessments will be holistic to include learning from previous components to interrupt the forgetting curve as well as provide opportunities for development feedback. There will be a Termly Summative Assessment in line with school policy.	Ongoing formative assessment to include questioning, peer and self-assessment, mini quizzes plenaries and use of mini WB etc to check for misconceptions and inform learning. Summative assessment will take place at the end of the unit of work based on topics learned. Assessments will be holistic to include learning from previous components to interrupt the forgetting curve as well as provide opportunities for development feedback. There will be a Termly Summative Assessment in line with school policy.	Ongoing formative assessment to include questioning, peer and self-assessment, mini quizzes plenaries and use of mini WB etc to check for misconceptions and inform learning. Summative assessment will take place at the end of the unit of work based on topics learned. Assessments will be holistic to include learning from previous components to interrupt the forgetting curve as well as provide opportunities for development feedback. There will be a Termly Summative Assessment in line with school policy.
	What does the end point look like? What is the impact of this component on the	**Learners will be able to:** • Recall that a general-purpose computing system is a device for executing programs and sequences of instructions.	**Learners will be able to:** • Describe the difference between 'data-driven' and 'rule-based' approaches to	**Learners will be able to:** • List examples of representations and recall that representations are used to store,	**Learners will be able to:** • Add, delete, and move objects • Scale and rotate objects • Add colour to objects	**Learners will be able to:** • Describe what algorithms and programs are and how they differ • Recall that a program written in a

	student's learning? What should the learning now look like via the assessment? Is disciplinary language used?	• Explain & analyse the difference between a general-purpose computing system and a purpose-built device including the hardware components. • Recall that all computing systems, regardless of form, have a similar structure ('architecture') • Define what an operating system is, and recall its role in controlling program execution • Describe the NOT, AND, and OR logical operators, and use logic gates to construct logic circuits. • Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits. • Provide broad definitions of 'artificial intelligence' and 'machine learning' and Identify examples of artificial intelligence in the real world.	application development. • Name examples of AI applications • Outline some benefits and issues of using AI applications. • Define machine learning's relationship to artificial intelligence. • Name the three common approaches to machine learning. • Describe how classification can be solved using supervised learning. • Describe the impact of data on the accuracy of a machine learning (ML) model. • Explain the need for both training and test data. • Explain how bias can influence the predictions generated by an ML model. • Describe how decision trees are used to build a classification ML model. • Describe how training data changes an ML model.	communicate, and process information • Provide examples of how different representations are appropriate for different tasks • Recall that characters can be represented as sequences of symbols and list examples of character coding schemes • Measure the length of a representation as the number of symbols that it contains • Explain what binary digits (bits) are, and measure the size or length of a sequence of bits as the number of binary digits that it contains • Describe how natural numbers are represented as sequences of binary digits • Convert a decimal number to binary and vice versa	• Add, move, and delete keyframes to make basic animations • Play, pause, and move through the animation using the timeline • Join multiple objects together using parenting • Use edit mode and extrude • Use loop cut and face editing • Use proportional editing • Use the knife tool • Use subdivision • Add and edit set lighting • Set up the camera • Compare different render modes • Create a 3–10 second animation that is **Fit For Purpose** • Render out the animation	programming language needs to be translated to be executed by a machine • Write simple Python programs that display messages, assign values to variables, and receive keyboard input • Locate and correct common syntax errors • Use simple arithmetic expressions in assignment statements to calculate values • Use relational operators to form logical expressions • Use binary selection (if, else staements) to control the flow of program execution including multi branch selection such as (elif) • Generate and use random integers • Describe how iteration (while statements) controls the flow of program execution • Use & combine iteration (while loops) to control the

		• Describe how machine learning differs from traditional programming. • Explain the implications of sharing program code.	• Explain why ML is used to create decision trees. • Describe the stages of the AI project lifecycle. • Use a machine learning tool to import data and train a model. • Test and examine the accuracy of an ML model. • Evaluate an ML model. • Produce a model card to explain an ML model. • Recognise the range of opportunities that exist in AI-related careers.	• Convert between different units and multiples of representation size • Provide examples of the different ways that binary digits are physically represented in digital devices.		flow of program execution • Use variables as counters in iterative programs
	How does it cover the NC? Refer explicitly to the NC or KS4 Assessment Objectives.	The topic meets the NC statement requirements for strands 3.4/3.5/3.6	The topic meets the NC statement requirements for strands 3.2/3.5/3.6/3.9	The topic meets the NC statement requirements for strands 3.6	The topic meets the NC statement requirements for strands 3.8	The topic meets the NC statement requirements for strands 3.1/3.2/3.3/3.6