Curriculum Map: Year 9 Computer Science

Topic	Key Knowledge *What will all students KNOW by the end of the topic?*	Key Skills *What key skills will be learnt/developed by the end of the topic? What will all students be able to DO by the end of the topic?*	Assessment Opportunities *What are the key pieces of assessment? How will students be assessed?*
Online Safety & fake news	**This unit first asks students to characterise why someone might use the internet and how their online needs change over time and how their online reputation may be affected.** **Students will be able to:** Devise strategies to counter negative online reputation. Use critical thinking skills to determine factors that affect how information is viewed online. Discuss examples of disinformation spread online. Define the term 'fake news' and discuss the quantity of fake news available online. Identify why fake news exists and who creates it. Discuss ways of identifying fake news and other forms of disinformation.	**Students will learn how to:** Identify fake news and incorrect information displayed online. Create strategies to improve a person's digital footprint. Use search engines effectively.	**Students will be assessed by:** Poster on how to build a positive online reputation. Topic summative assessment.

Curriculum Map: Year 9 Computer Science

Computational Thinking and flowcharts.	**In these lessons, learners are introduced to three computational thinking techniques: decomposition, abstraction, and algorithmic thinking.** **Students have to solve problems by applying decomposition, abstraction, and algorithmic thinking.** **Students will be able to:** Define the terms decomposition, abstraction and algorithmic thinking. Recognise scenarios where each of these computational thinking techniques are applied. Apply decomposition, abstraction and algorithmic thinking to help solve a problem. Describe the difference between algorithms and computer programs. Identify algorithms that are defined as written descriptions, flowcharts, and code. Analyse and create flowcharts using the flowchart symbols.	**Students will learn how to:** Decompose a problem and apply abstraction to derive a solution. Use of software packages to create digital versions of flowcharts.	**Students will be assessed by:** Peer assessment of 'step by step' activity. Creation of flowcharts.
Python Programming with Sequences of data	**This unit introduces students to how data can be represented and processed in sequences, such as lists and strings. The spectrum of problems used in the programming tasks are realistic and engaging students will process solar system planets, book**	**Students will learn how to:** Use selection (if-elif-else statements) to control the flow of program execution. Create lists and access individual list items.	**Students will be assessed by:** Completion of mini-project. Topic summative assessment.

	texts, capital cities, leaked passwords, word dictionaries, ECG data, and more. **Students will be able to:** Write programs that display messages, receive keyboard input, and use simple arithmetic expressions in assignment statements. Locate and correct common syntax errors. Perform common operations on lists or individual items. Perform common operations on lists or individual items. Perform common operations on strings or individual characters. Perform common operations on lists or strings. Combine key programming language features to develop solutions to meaningful problems.	Use iteration (while statements) to control the flow of program execution. Use iteration (for statements) to iterate over list items. Use iteration (for loops) to iterate over lists and strings. Use variables to keep track of counts and sums	

Curriculum Map: Year 9 Computer Science

Data Science	**In this unit, students will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends. Towards the end of the unit, they will go through the steps of the investigative cycle to try to solve a problem in the school using data.** **Students will be able to:** Define data science. Explain how visualising data can help identify patterns and trends to help us gain insights. Recognise examples of where large data sets are used in daily life. Evaluate findings to support arguments for or against a prediction. Define the terms 'correlation' and 'outliers' in relation to data trends. Solve a problem by implementing steps of the investigative cycle on a data set. Use findings to support a recommendation and draw conclusions.	**Students will learn how to:** Use an appropriate software tool to visualise data sets and look for patterns or trends. Select criteria and use data set to investigate predictions. Create a data capture form. Apply data cleansing techniques to a data set Visualise a data set. Analyse visualisations to identify patterns, trends, and outliers.	**Students will be assessed by:** Topic summative assessment.

Curriculum Map: Year 9 Computer Science

Introduction to cybersecurity	**This unit takes the learners on an eye-opening journey of discovery about techniques used by cybercriminals to steal data, disrupt systems, and infiltrate networks. The students will start by considering the value of their data to organisations and what they might use it for. They will then look at social engineering techniques used by cybercriminals to try to trick users into giving away their personal data. The unit will look at the more common cybercrimes such as hacking, DDoS attacks, and malware, as well as looking at methods to protect ourselves and our networks against these attacks.** **Students will be able to:** Identify what happens to data entered online. Explain the need for the Data Protection Act and the Computer Misuse Act. Recognise how human errors pose security risks to data. Define hacking in the context of cyber security Explain how a DDoS attack can impact users of online services List the common malware threats and examine how different types of malware causes problems for computer systems.	**Students will learn how to:** Critique online services in relation to data privacy. Implement strategies to minimise the risk of data being compromised through human error. Identify strategies to reduce the chance of a brute force attack being successful. Identify the most effective methods to prevent cyberattacks. Question how malicious bots can have an impact on societal issues.	**Students will be assessed by:** Topic summative assessment (under attack)

Curriculum Map: Year 9 Computer Science

	Compare security threats against probability and the potential impact to organisations. Explain how networks can be protected from common security threats.		

Curriculum Map: Year 9 Computer Science

Data representations – going audio visual	**In this unit, students will focus on digital media such as images and sounds and discover the binary digits that lie beneath these types of media.** **This unit also has a significant practical aspect. Learners will use relevant software (GIMP and Audacity, in this case) to manipulate images and sounds and get an idea of how the underlying principles of digital representations are applied in real settings.** **Students will be able to:** Describe how digital images and sounds are composed of individual elements and that an image can be represented as a sequence of bits. Recall that the colour of each picture element is represented using a sequence of binary digits. Define key terms such as 'pixels', 'resolution', and 'colour depth'. Describe how colour can be represented as a mixture of red, green, and blue, with a sequence of bits representing each colour's intensity. Describe the trade-off between representation size and perceived quality for digital images. Explain how the manipulation of digital images amounts to arithmetic operations on their digital representation.	**Students will learn how to:** Compute the representation size of a digital image, by multiplying resolution (number of pixels) with colour depth (number of bits used to represent the colour of individual pixels). Perform basic image editing tasks using appropriate software and combine them to solve more complex problems requiring image manipulation. Calculate representation size for a given digital sound, given its attributes. Perform basic sound editing tasks using appropriate software and combine them to solve more complex problems requiring sound manipulation.	**Students will be assessed by:** Topic summative assessment.

Curriculum Map: Year 9 Computer Science

	Describe and assess the creative benefits and ethical drawbacks of digital manipulation (Education for a Connected World). Explain the function of microphones and speakers as components that capture and generate sound. Explain how attributes such as sampling frequency and sample size affect characteristics such as representation size and perceived quality, and the trade-offs involved. Define 'compression', and describe why it is necessary.		

Curriculum Map: Year 9 Computer Science

Creating media using amination software.	**Films, television, computer games, advertising, and architecture have been revolutionised by computer-based 3D modelling and animation. In this unit students will discover how professionals create 3D animations using the industry-standard software package, Blender. Students will gain a greater understanding of how this important creative field is used to make the media products that we consume. Sessions will take learners through the basics of modelling, texturing, and animating; outputs will include 3D models, short videos, and VR.** **Students will be able to:** Create a simple animation using Pivot Stickman software. Use an open-source software package to create animations. Move, rotate, scale and colour objects. Apply parenting to objects. Combine elements to create complex models.	**Students will learn how to:** Add, delete, and move objects. Scale and rotate objects Use a material to add colour to objects 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. Apply different colours to different parts of the same model. Use tool such as; the knife tool, subdivision, lighting etc. Set up the camera. Compare different render modes. Create a 3–10 second animation Render out the animation.	**Students will be assessed by:** Creation of animation. Topic summative assessment.