Year 8 Computing at CLHS

## Topic 1 – Understanding Computers

Year 8 introduces more Computer Science concepts with pupils learning how computers work, how they represent text, images and sounds then moving to look at how data is transferred across networking devices and the importance of cyber security. Pupils finish the year the study of vector graphics, their properties, design and use.

1. Understanding binary – What is binary and how do computers use it to store information? Learn how to count in binary and mathematical operations. Understand the concept of bits in relation to computer memory.

2. ASCII – How do computers use ASCII to represent text? Understand the need protocols when developing computer codes and systems. Attempt to convert ASCII to plain text and the reverse.

3. Digital Images – How do computers represent images? Learn about pixels, RGB colours, bitmaps, meta data and resolution. Learn how to write computer code to display an image on screen.

4. Digital sound – How do computers represent sound? Learn how computers sample analogue sound waves and recreate them digitally. Understand about sound sample rates and sample your own sound wave.
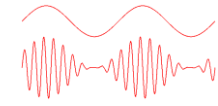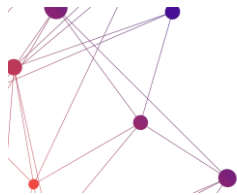
5. Machine code – How do computers carry out instructions? Learn about Opcode, machine codes and instructions. Demonstrate then ability to write machine code by recreating your name in machine code. Complete a summative assessment of the unit.

Year 8

Half Term 1

Half Term 2

5. Internet Services – Learners will understand the difference between the World Wide Web and the internet. Explore the emergence of the Internet of things (IoT) and make predictions on future web developments that may take place with a particular focus on privacy and security. **Assessment** – Undertake an summative assessment on network protocols an hardware.

4. The internet – Learn about the history of the internet from it's small beginnings as a military assets to the globe spanning network that it is today. Understand how data is transmitted over the internet in "packets" and the importance of networking protocols such as TCP/IP and HTML

3. Wired and wireless networks – Explore the different wireless technologies of 3G, 4G, and 5G. Develop an understanding of the term 'bandwidth'. Explore the advantages and disadvantages of wired and wireless networks. And identify whether a wired or wireless network should be used in a number of given scenarios.

Topic 2 – Networks and Protocols

1. Computer networks and protocols – learn what a computer network is, along with the meaning of the word 'protocol'. Gain an appreciation of the growth of networked devices. Identify different greeting protocols and use a series of protocol commands in a 'climber/belayer' scenario. Finally, explore the connection between non-networking and networking protocols.

2. Networking hardware – Explore the functionality of key hardware components found in a network - network cables, hubs, servers and routers. Use this knowledge of to build a series of increasingly complicated network diagrams and produce inventive and creative solutions to networking problems.
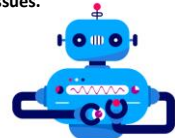
Half Term 3

Half Term 4

Topic 3 – Data and Cyber security

1. You and your data – learn what data companies collect from their users and how they you may already be giving data to. Explore the laws regarding data protection and will reflect on why cybercriminals might want to gain access to data and how to protect yourself from potential cyber crime.

2. Social engineering – learn what data companies collect from their users and how they you may already be giving data to. Explore the laws regarding data protection and will reflect on why cybercriminals might want to gain access to data and how to protect yourself from potential cyber crime.

3. Social engineering – Be aware of how humans can be a weak point in the system, as well as looking at the social engineering tactics deployed by cybercriminals to dupe users into giving away data that could lead to further crime. Explore the common social engineering techniques, and start to consider the consequences of the scams and how to avoid becoming a victim.

5. Rise of the bots – Become aware of malware and the different categories of malware, as well as understanding how they work and the potential damage they can do. Explore scenarios that demonstrate the hidden role of bots and what potential influence they could have on societal issues.

Topic 4 – Vector Graphics

1. Get into shapes – Gain an understanding of vector graphics and where they are used such as logos, icons, and illustrations. Use graphic editing software to draw and manipulate objects and experiment with their properties (fill and stroke, flip, z-order etc.)

3-4. Icon challenges – Using the skills learnt so far and some creative thinking to create a set of monochrome icons. Using elementary shapes and operations, creating any shape imaginable is possible. Learn how to Convert objects to paths, Draw paths and Edit path nodes to create complex and professional looking final products.

Half Term 5

Half Term 6

6. There's no place like 127.0.0.1 - Develop your understanding of the risks that cyber threats pose to a network, and explore methods of defending a network against attacks, such as firewalls and anti-malware. Study real-world examples of cyber attacks and investigate the impact on businesses and individuals. **Assessment** - use unit knowledge and skills to plan and design a cyber defence strategy on a tight budget.

2. Paths united – Using path operations such as union, difference, and intersection, students are able to combine simple shapes into more complex ones. Learn how to Manipulate groups of objects (select, group/ungroup, align, distribute) and combine paths by applying operations (union, difference, intersection)

5. Under the hood – Time to investigate what vector images are really made of. Study the working of and modify an .svg file to grasp how it is essentially a structured description of an image and how that image is rendered when viewed. Explore cases where vector graphics are (or aren't) useful.

6. Showcase and assessment – A chance to conclude, showcase, and peer assess projects. Improve your own project work based on feedback. Complete a summative assessment on the properties, uses and characteristics of vector graphics.