Computer Science

ALDER
Community High School

Year 10

Autumn 1	**Computer Hardware** Students will learn about a range of different types of computer systems including embedded systems. From there they will the study the stored program concept, and the role of memory, the CPU and buses in the fetch-decode-execute cycle. They will also examine the role of secondary storage and learn how data is stored on different types of media.
Autumn 2	**Programming and Algorithms 1** Students will be introduced to the basic concepts of programming including variables and datatypes, selection and repetition. They will write code using Python taking advantage of inbuilt subprograms for input, output and strings. They will learn how to use Boolean Operators and how to create associated truth tables.
Spring 1	**Data** Students will learn why computers use binary. They will practice converting between unsigned and signed denary and 8-bit binary numbers, adding and shifting binary numbers, and converting between hexadecimal and binary. At this point they will also consider why hexadecimal is used in computer science. Students will also explore how binary can represent text, images and sound. They will construct expressions to calculate file sizes establish data capacity requirements. Students will also consider the need for and different methods of data compression.

Spring 2	**Programming and Algorithms 2**
	Students will practice using Python subprograms related to lists and will explore the various ways to iterate through data structures using for loops. Students will learn how to create their own subprograms and learn the difference between functions and procedures. They will also consider their first key programming algorithm – linear search.

Summer 1	**Networks**
	Students will learn what a network is and the reasons for connecting computers in a network. They will examine different types of networks, common network topologies and the characteristics of wired and wireless connectivity. Students will practice constructing expressions involving file size, time, and transmission rate measured in bits per second. They will what the internet is and how it is structured. They will study network protocols and the TCP/IP stack before considering the importance of network security, and ways of identifying vulnerabilities and protecting networks.

Summer 2	**Network Threats and Software**
	Students will build on their knowledge of threats to a network. Looking in detail at a number of types e.g. Malware, social engineering, brute force attack, Dos and SQL injection. They will explore how the attack is used and the purpose of the attack. Students will also learn ways to prevent vulnerabilities in particular, pen testing, firewalls, user access levels, encryption and physical security. Students will explore software licences they will look at different types of software Open source and Proprietary, exploring the features of these two and the benefits and drawbacks of using them.