Curriculum Intent of COMPUTER SCIENCE

September 2021

GCSE COMPUTER SCIENCE

INTENT

We will enable students to:-

- understand and apply the fundamental principles and concepts of computer science, including abstraction, decomposition, logic, algorithms, and data representation
- analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs
- think creatively, innovatively, analytically, logically and critically
- understand the components that make up digital systems, and how they communicate with one another and with other systems
- understand the impacts of digital technology to the individual and to wider society
- apply mathematical skills relevant to computer science

SKILLS

Students will develop the following skills:-

- take a systematic approach to problem solving including the use of decomposition and abstraction, and make use of conventions including pseudo code and flowcharts
- design, write, test and refine programs, using one or more high-level programming language with a textual program definition, either to a specification or to solve a problem
- use appropriate security techniques, including validation and authentication
- evaluate the fitness for purpose of algorithms in meeting requirements efficiently using logical reasoning and test data1
- use abstraction effectively
- to model selected aspects of the external world in a program
- to appropriately structure programs into modular parts with clear, well documented interfaces
- apply computing-related mathematics

KNOWLEDGE

Students will develop is knowledge and understanding of computer science and programming including :-

- standard algorithms, including binary search and merge sort
- following and writing algorithms to solve problems
- how particular programs and algorithms work
- the concept of data type, including integer, Boolean, real, character and string, and data structures, including records and one- and two-dimensional arrays
- representation of numbers in binary and hexadecimal; conversion between these and decimal; binary addition and shifts
- representation of text, sound, and graphics inside computers
- Boolean logic using AND, OR and NOT, combinations of these, and the application of logical operators in appropriate truth tables to solve problems
- the purpose and functionality of systems software, including the operating system and utility software
- characteristics of systems architectures and networks cyber security: forms of attack (based on technical weaknesses and behaviour), methods of identifying vulnerabilities, and ways to protect software systems (during design, creation, testing, and use)
- the ethical, legal and environmental impacts of digital technology on wider society, including issues of privacy and cyber security
- characteristics and purpose of different levels of programming language, including low-level language