Computer Science

Overview

Britain urgently needs Computer Scientists! The old ICT syllabus helped students to master various software products and have an awareness of the internet, but it lacked the technical computer hardware and software engineering that is necessary to move the current school population forward into the modern job market where huge skill shortages exist. Portchester Community School follows a Computer Science syllabus incorporating some digital literacy at Key Stage 3.
Students at Key Stage 4 are offered OCR Computer Science GCSE.

Key Stage 3:

The government's guidelines for what should be taught at Key Stage 3 (Year 7 and 8) is reproduced below. All of these curriculum areas are covered within the syllabus delivered by Portchester Community School.

Students should be able to:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
- use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
- understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

Computer Science at KS3:

- Computer Systems – input, processing, output, storage
- Coding to create games (Construct 2)
- Digital editing (sound, graphics, video, animations)
- Cyber Security
- Binary coding, units of measurement (Kb, Mb, Gb, Tb, Pb, KHz, MHz, GHz)
- Coding in high level languages (html, Python)
- Algorithms (Flowcharting, Pseudocode)
- Spreadsheets and Databases (Digital Literacy)
- Robotics
- Artificial Intelligence
- Moral and Social issues, digital safety

Key Stage 4:

Students who opt for Computer Science at Key Stage 4 will be following the OCR 2016 GCSE syllabus with grades available in the standard range 1-9. The syllabus will be updated in 2019.

Assessment comprises two 90 minute examinations each worth 50% of the total mark. Paper 1 is about technical aspects of computer infrastructure and software. Paper 2 is concerned with binary and hexadecimal coding, algorithms and programming techniques.

The course included a compulsory non-examined 20 hour unit in Python programming which is internally marked and externally moderated.

Coursework components are:

- Computer Systems
- Input, Output, Storage
- Types of memory, RAM, ROM
- Computational thinking and algorithms
- Systems architecture (Von Neumann), the fetch-decode-execute cycle
- Network topography and protocols. WANs and LANs
- System Security
- System Software
- Ethical, Legal, cultural and environmental issues
- Algorithms
- Programming concepts and techniques
- Computational logic, Boolean algebra (AND, OR, NOT)
- Data representation, compression

The BBC Bitesize site covers the entire OCR syllabus

https://www.bbc.co.uk/bitesize/examspecs/zmtchbk

Computer Science staff:

Mr S Harvey – Subject Leader for Computer Science
Mrs B Lloyd – teacher of Computer Science KS3