

Computer Science is the study of principles and practices that underpins an understanding and modelling of computation, and of their application in the development of computer systems.

Computer Science is deeply concerned with how computers and computer systems work, and how they are designed and programmed.

We want our students to understand and play an active role in the digital world that surrounds them, not to be passive consumers of an opaque and mysterious technology. A sound understanding of computing concepts will help them see how to get the best from the systems they use, and how to solve problems when things go wrong.

What will students experience at KES?

Key Stage 3 Overview

Students will design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems. They will learn 2 text based programming languages: Python and HTML. Students will understand how computers work by looking at the hardware that make up computer systems. They will begin to understand how various types of instructions are stored and executed in computer systems, and how they can be used to represent images, music and text.

They will understand a range of ways to use technology safely, respectfully, responsibly and securely: including protecting their online identity and privacy; recognising inappropriate content; and knowing how to report concerns.

The Computing syllabus has been designed to cover the three main areas of Digital Literacy, Computer Science and Information Technology.

Computing Key Stage 3 – Year 7

The students will be introduced to the IT skills they will need to support other subjects across the curriculum and will be introduced to programming, algorithms, some more complex elements of software packages and an understanding of computer hardware and how it works.

- An introduction to KES Systems, OneDrive, Email, word, hardware and inputs/outputs
- Introduction to databases – students are taught to setup a structure, enter data and interrogate the data.
- Sphero robots – students are introduced to programming using mini Sphero robots, they use block code to move the robots around shapes and mazes.
- E-safety
- Introduction to scratch programming with microbits, preparing them for using python in Year 8

Computing - Year 8

Throughout Year 8 students will continue to study IT/Computing and build upon the skills they have been introduced to in Year 7. This year is used to develop more programming skills, including the introduction of textual programming.

- Microbit Projects - Students will be introduced to using python programming language. They are introduced to programming basics and then will develop these skills to create bespoke projects using the Microbit technologies.
- Computing Theory - An Introduction to Binary, Binary Addition and ASCII
- Relational databases
- E-safety
- Website Development – Students are taught to use the Dreamweaver software along with being introduced to CSS and HTML

Computing Year 9

There will be a deeper focus on programming skills and a look at some of the GCSE theory to give the students a good insight into the GCSE Computer Science and preparation for B-Tec DIT syllabuses.

- Website Development – Students are taught to use the Dreamweaver software along with being introduced HTML
- Cybersecurity
- Spreadsheet Modelling – Students will complete a series of lessons looking at the basic and more complex functions of spreadsheet modelling
- Careers in computer science
- Python Programming - Students to build upon their skills through completing challenges
- Photoshop – Students are introduced to Adobe Photoshop

Vocabulary and Assessment Summary

Students will be given access to a glossary of terms for the year, pupils will be tested regularly on keywords from each topic area.

Assessment will range from assessments using Moodle and peer and teacher assessment.

In each of the year groups, staff will build in questions to test knowledge from previous units, from the current year and other years. Building on their prior knowledge, any misconceptions

Key Stage 4 and Key Stage 5

- Develop their understanding of current and emerging technologies,
- Understanding of how they work and apply this knowledge and understanding in a range of contexts acquire and apply a knowledge, some technical skills and an understanding of the use of algorithms in computer programs to solve problems using programming use their knowledge and understanding of computer technology to become independent and discerning users of IT,
- Able to make informed decisions about the use and be aware of the implications of different technologies acquire and apply creative and technical skills,
- Knowledge and understanding of IT in a range of contexts
- Develop computer programs to solve problems
- Develop the skills to work collaboratively
- Systems Architecture – the components that make up a working computer systems
- Network topologies, protocols and layers – how networks can be set up and the rules used to govern communication
- System security – a look at the threats and methods of prevention used to keep data in networks safe
- System software – the difference between utility software and operating system software and the importance of them to modern day computer systems
- Programming techniques - Using Python including skills such as sequencing, selection and iteration, saving to external text files, reading and writing data, lists, dictionaries and SQL
- Computational logic – logic gates and how decisions are made by a computer system

- Translators and facilities of languages – high and low level programming languages, assembly language and machine code
- Data representation – binary and hexadecimal representation of numbers, text, images and sound
- Students will complete a 20-hour programming project where they will have the opportunity to showcase their programming skills. Students will produce a portfolio of evidence to show their analysis skills, designs skills, programming and testing skills and finally their reflection skills. On successful completion of the project students will receive a certificate from the exam board to acknowledge their practical ability in Computer Science.

Extra Curricular

- Students will be given opportunities attend coding club, lunch-time clubs with university students, building computers, installing hardware.
- To develop further links with University of Sheffield – by receiving student to deliver computing clubs to enhance the provision for our students
- Visit to the Diamond centre to work with their VR/robotics

Home Learning Policy

Home Learning Intent:

We set home learning in ICT and Computer Science to support the students remember the learning that has taken place in their lessons.

We want students to develop their understanding of the subject and develop their skills in the use of technology.

Students who complete homework have a better chance of getting a higher grade in this subject because they are more likely to remember the content needed.

Home Learning Expectations:

Key Stage 3

In Computer Science and ICT we will set a minimum of one homework a half term; we expect every student to attempt all homework to the expected standard that they have been set. This may be a research task or a task to support some learning that has taken place in class.

On occasion this may be set on Moodle and students who do not have access to this at home will be given time to inform their teacher and the opportunity to access this in school.

At the end of the year KS3 students will be given a knowledge organiser which condenses all the materials for the year group they are in, including any previous years. Students will then sit an assessment on all elements of the curriculum they have covered, since starting at KES. Students are expected to revise at home using their knowledge organiser. Students who have limited quiet space can attend a homework club during the week.

Key Stage 4

In GCSE Computer Science we will set one homework per week we expect every student to attempt all homework to the expected standard that they have been set. This may be a research task or a task to support some learning that has taken place in class.

On occasion this may be set on Moodle and students who do not have access to this at home will be given time to inform their teacher and the opportunity to access this in school. Some examples might be a quiz, learning key vocab, preparation for the next lesson – research on a topic.

B-Tec Digital Technology we will give students homework on a weekly basis around the topic area in addition to this, B-Tec students will also be given assignments (which count towards their final B-Tec grade) when assignments are given out – students will then be given the assignment as their homework. First attempt assignments – students must put their best effort into the assignment, ensuring they attempt to achieve all the criteria set out in the assignment brief. Student may be given an opportunity to re-submit their work. Once the re-submission has been handed in, students can not improve their work and more.

All students are provided with a list of topics to revise for assessments and students are expected to revise as homework. There is an assessment at the end of most topics.