<u>Welcome to the Computing Department</u>

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Subject Overview

Key Stage 3

Computers are an important element in all aspects of life in the 21st Century and our course helps students understand the principles of computing and how to use practical applications including the use of Google documents, Google sheets and Google slides. There is also the opportunity to practise and use the internal gmail system to communicate with teachers and an emphasis on e-safety. Once the school systems are introduced the students investigate system networks. This unit begins by defining a network and addressing the benefits of networking, then moving onto basic programming in Y7 and more advanced programming in Y8.

Teaching Aims and Objectives

The overall aims within the computing department are for students to:

- Be able to use a variety of different software depending on need.
- Be aware of safety and be able to take measures to stay safe online.
- 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 be inspired by the opportunities available within the world of computer science.
- Understand the impacts of digital technology to the individual and to wider society apply mathematical skills relevant to computer science.
- Understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- Analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- Evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- Be responsible, competent, confident and creative users of information and communication technology

Course Information

Key Stage 3

Year 7

1. **Using Google Suite**
   Students learn the fundamentals of using the Google suite

2. **Collaborating online respectfully**
   This unit has been designed to ensure that learners are given sufficient time to familiarise themselves with the school network. It also allows the teacher to discuss appropriate use of the school network, and to update and remind learners of important online safety issues. Whilst completing this unit, learners will also learn how to use presentation software effectively. In terms of online safety, this unit focuses on respecting others online, spotting strangers, and the effects of cyberbullying.

3. **Networks**
   This unit begins by defining a network and addressing the benefits of networking, before covering how data is transmitted across networks using protocols. The types of hardware required are explained, as is wired and wireless data transmission. Learners will develop an understanding of the terms 'internet' and 'World Wide Web', and of the key services and protocols used. Practical exercises are included throughout to help strengthen understanding.

4. **Using Media**
   During this unit, learners develop their understanding of information technology and digital literacy skills. They will use the skills learnt across the unit to create a blog post about a real-world cause that they would like to gain support for. Learners will develop software formatting skills and explore concerns surrounding the use of other people's work, including licensing and legal issues.

5. **Programming 1**
   This unit is the first programming unit of KS3. The aim of this unit and the following unit ('Programming 2') is to build learners' confidence and knowledge of the key programming constructs. Importantly, this unit does not assume any previous programming experience, but it does offer learners the opportunity to expand on their knowledge throughout the unit. The main programming concepts covered in this unit are sequencing, variables, selection, and count-controlled iteration. All of the examples and activities for this unit use Scratch 3.

6. **Programming 2**
   Programming 2 follows on from the foundations built in 'Programming I'. It is vital that learners complete 'Programming I' before beginning this unit. This unit begins where 'Programming I' left off. Learners will build on their understanding of the control structures' sequence, selection, and iteration (the big three), and develop their problem-solving skills. Learners will learn how to create their own subroutines,

develop their understanding of decomposition, learn how to create and use lists, and build upon their problem-solving skills by working through a larger project at the end of the unit.

7. **Mobile App Development**
In a world where there's an app for every possible need, this unit aims to take the learners from designer, to project manager, to developer in order to create their own mobile app. Using Javascript on App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in previous units before undertaking their project. Learners will consider the needs of the user; decompose the project into smaller, more manageable parts; use the pair programming approach to develop their app together; and finish off by evaluating the success of the project against the needs of the user. It gives them an easy introduction to designing a GUI (Graphical User Interface)

Year 8

1. **Computing Systems**
This unit takes learners on a tour through the different layers of computing systems from programs and the operating system, to the physical components that store and execute these programs, to the fundamental binary building blocks that these components consist of. The aim is to provide a concise overview of how computing systems operate, conveying the essentials and abstracting away the technical details that might confuse or put off learners. The last lessons cover two interesting contemporary topics: artificial intelligence and open source software. These are linked back to the content of the unit, helping learners to both broaden their knowledge and focus on the topics addressed in the unit.

2. **Python – and introduction**
This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is placed on tackling common misconceptions and elucidating the mechanics of program execution. A range of pedagogical tools is employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples.

3. **Python – Programming with sequences of data**
This unit introduces learners to how data can be represented and processed in sequences, such as lists and strings. The lessons cover a spectrum of operations on sequences of data, that range from accessing an individual element to manipulating the entire sequence. Great care has been taken so that the selection of problems used in the programming tasks are realistic and engaging: learners will process solar system planets, book texts, capital cities, leaked passwords, word dictionaries, ECG data, and more.

KS4

Students will follow the OCR J277 Computer Science Course. The course is examined using 2 papers. Paper 1 is all about the hardware involved in a modern windows network PC based computer system. Paper 2 looks at the theory and good practice in writing robust code. Students are given an opportunity to put it all together to write code in projects. The students will have an opportunity to do project work in Python. To design GUI's in Javascript testing the code on modern internet browsers and work with electronics components using the Arduino microprocessor. The Arduino set s come with a wide range of sensors and components and will give a wide variety of code to be written. Specific areas of study include

Component 01: Computer systems
Introduces students to the central processing unit (CPU), computer memory and storage, data representation, wired and wireless networks, network topologies, system security and system software. It also looks at ethical, legal, cultural and environmental concerns associated with computer science.

Component 02: Computational thinking, algorithms and programming
Students apply knowledge and understanding gained in component 01. They develop skills and understanding in computational thinking: algorithms, programming techniques, producing robust programs, computational logic and translators.

Practical programming
Students are to be given the opportunity to undertake a programming task(s) during their course of study which allows them to develop their skills to design, write, test and refine programs using a high-level programming language. Students will be assessed on these skills during the written examinations, in particular component 02 (section B).

Homework Expectations (Including ICT resources and websites)

Students in Key Stage 3 are set homework every other lesson. This homework could be focused on the core lesson task and allow students to continue and make further progress. Sometimes the work set may be in preparation for the next lesson and might require students to access specific online help sources. Every effort is taken to support students who do not have home access to a computer or may need to use an alternative piece of software. Most homework will require students to be able to access the school's virtual learning environment (VLE) to access additional support materials and sometimes to submit their completed work and self-assessment. Where students are expected to access particular websites these will be provided on the VLE.

GCSE students are set homework to focus on extending the students' understanding of a topic through extension activities, wider questioning or research. There may be occasions when students are encouraged to use additional homework time to prepare for controlled assessment tasks.

Websites frequently used:

- [Computer Programming](#)
- [Programming Tutorial](#)
- [Logic](#)
- [Curriculum](#)
- [Teach ICT](#)
- [GCSE Computing](#)
- [Hour of Code](#)
- [App Development](#)
- [Programming](#)
- [Game Design](#)

Extra-Curricular Opportunities

Unless restrictions due to COVID apply students have access to IT rooms before school and also during morning break and lunchtime. During this time students can continue with classwork or homework and they can also use the time to extend their software skills beyond the confines of the classwork. Science are running a coding club using robotic lego.

Marking and Assessment

Students' work is marked regularly to acknowledge effort, skills, knowledge, understanding and the development of independent learning.

Marking takes three forms:

- Marking in class
- Peer and self-assessment
- Formative assessment

Marking in class is intended to check that all work has been completed with appropriate effort by the students. Computing teachers do not formally grade this work, but will offer encouragement and may point out spelling and grammatical errors or give directions on how to improve the presentation or content of the work. It is expected that this will take place during a module and that the student will then have the opportunity to make the improvements needed.

Peer and self-assessment is used to enable to students to reflect on the mark scheme and expectations and make their own determination about the standard of a piece of work. It is used to provide immediate feedback during lesson times and helps to ensure that students have a robust understanding of the assessment criteria and the work expectations.

Formative assessment is intended to give specific advice to each individual student. At key stage 3, this form of marking will usually form a key part of each project and will be used to give feedback to the student about the standard of their work and the depth of their understanding in relation to the computing progression pathway which students are following.

At the end of each module students will have the opportunity to complete a formal assessment of their current level of knowledge, understanding and skills. This will allow

students to identify what went well during the previous terms' work and what they now need to do to improve.