



# Willingdon

COMMUNITY SCHOOL

CURRICULUM BOOKLET

# IT and Computer Science

September 2021

**It's about problem solving, not computers.**

# Our School Curriculum Vision

To provide a curriculum fit for our students' future, building on the successes of their past (ready for post 16 and life). This allows our students to be safe, happy, well informed global citizens who have experienced a five - year progressive and dynamic curriculum where they have the opportunity to aspire and achieve their fullest potential. This will embody the school's values of 'Personal Excellence' through a broad and balanced curriculum, which is inclusive and reflective of our local needs.

## Subject Vision for IT&C

IT and Computer Science is about problem-solving, not about computers - so our vision is to equip students with the problem solving and computational thinking skills needed to thrive in the digital world.

Our curriculum is jobs centric and focuses on the knowledge and skills required to be successful in that particular space. We want to increase student awareness of the range of jobs available in the technology industry while setting them up to be leaders in these fields.

Ultimately we don't just want our students to say "I want to work in technology" we want them to be able to say "I want to be a...".

# Key Concepts in IT & Computer

Broadly speaking IT & Computer Science breaks down into a choice between working with hardware or working with software and our curriculum reflects this.

Each year starts with learning how to be safe, **considerate and mindful of others' actions on-line**. In this e-safety unit, we teach students how to limit their exposure to, and minimise risk from, both virus and unwanted content.

The key computational thinking skills of decomposition and abstraction are emphasised through the use of project-based learning that focuses on problem-solving.

Students are also exposed to a variety of coding languages and formats, as well as how to use flowcharts and pseudocode. These skills feature heavily with increasing demand for students to develop their coding skills as they move towards GCSE.

At KS3, students are given a broad knowledge of computer hardware at KS3, with a focus on developing an understanding of how the main hardware features of any device work together. This includes exploring the concept of binary and how it is used to represent text, image and sound.

Students will develop their ability to plan and produce interactive and engaging products within a variety of modern scenarios. They will link interactive and dynamic products using a variety of graphic design and web development skills.

In order to best prepare them for the data driven, digital world, that we live in, students also develop skills in Excel and Google Sheets used for data interrogation and number manipulation.

# Programme of Study Key Stage 3

## Y7 Outline of units

- E-safety
- I want to be a Hardware Engineer
- I want to be a Data Analyst
- I want to be a Robotics Engineer
- I want to be a Web Developer
- I want to be a Programmer
- I want to be a Graphic Designer



```
Username = input("Please enter your Username:")
Password = input("Please enter your Password:")

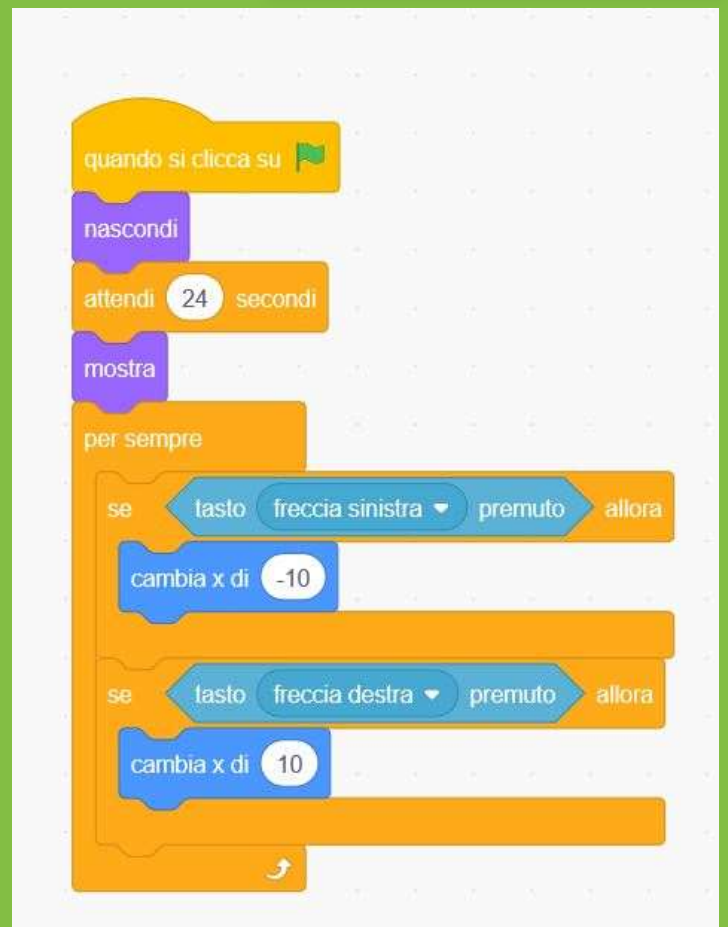
if Username == "Admin" and Password == "1234":
    print("Access allowed, Welcome to the network")
else:
    print("Access denied!!")
```

## Y8 Outline of units

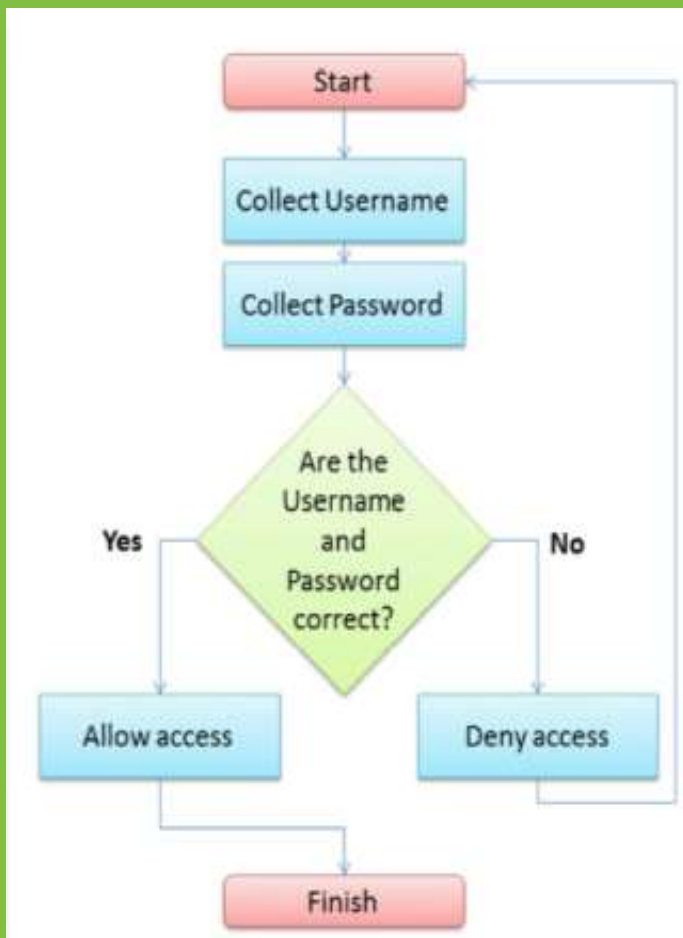
- E-safety
- I want to be an Automation Engineer
- I want to be a Game Developer
- I want to be a Hardware Engineer
- I want to be a Data Analyst
- I want to be a Graphic Designer
- I want to be an App Developer

## Y9 Outline of units

1. E-safety
2. I want to be a Software Engineer
3. I want to be a YouTuber



# Assessment Plan for Key Stage 3



Students receive live feedback and marking every lesson and are expected to make improvements to their work based on the feedback given.

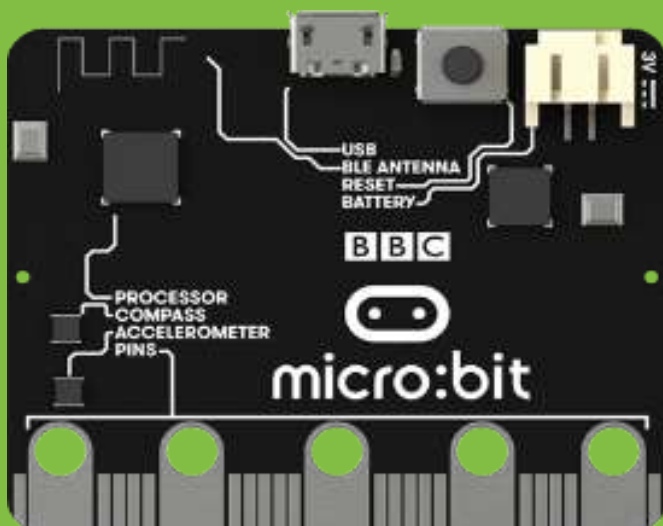
Towards the end of each project or unit, students receive feedback in one of three ways – either by using a given set of success criteria to facilitate self-feedback or using success criteria to provide peer feedback to a classmate. In other units, students will receive teacher feedback on their task.

Each of these types of feedback will provide students with an improvement target alongside praise for a part of the work that is particularly good or shows achievement beyond their current working level. Students are then expected to use these improvement targets as the starting point to make further improvements to their work. Students will also receive literacy feedback on their written work

Knowledge and understanding are tested in a variety of ways: using online tests, end of unit tests or by the quality of their solutions to the various tasks, they are given

Before each project, students are provided with an exemplar and a set of success criteria so that students know what they are expected to include and the quality they are expected to aspire to.

Homework is set every other lesson to reinforce learning or test specific vocabulary.





# Options Booklet Entry

## GCSE Computer Science

**Component 1** focuses on how data is processed. It includes detailed study of the CPU and the fetch execute cycle that controls the processing of data. It then goes on to focus on the components that support the CPU and allow the processing of data, as well as looking at how networks allow data to be transmitted and the software that provides the instructions to the CPU of how to process a given piece of data. Finally, students will look at a range of ethical, legal and environmental issues and impacts related to digital technology.

It is a 1 hour 30 minutes written paper worth 50% of the final mark.

**Component 2: Computational thinking, algorithms and programming 50% - Exam**  
Component 2 focuses on computational thinking. Students need to be able to design and produce solutions to given problems by breaking the task down into smaller tasks, ignoring unnecessary details, and then developing a step-by-step solution to the problem. Students will be asked to give, interpret, edit and write flowcharts, pseudocode and OCR's exam reference language in their answers.

It is a 1 hour 30 minutes written paper worth 50% of the final mark.

*“ GCSE Computer Science is an option that takes dedication, hard work, and a passion for the subject. It's incredibly rewarding and great fun - I mean, what isn't fun about creating programs that can do awesome things? But you will also have to put a lot of effort into your work during the course. I recommend this subject for creative people, who have a passion for computers, enjoy maths (don't worry too much if you don't though), and people with dedication. But have fun too; it's a highly enjoyable course! ”*

## BTEC Digital Information Technology:

At Key Stage 4, students will follow the BTEC Tech Award in Digital Information Technology; the qualification builds on learning from Key Stage 3 for those who may wish to explore an ICT route throughout Key Stage 4. The BTEC Tech Award qualification is designed to inspire students to become technology savvy and allows them to gain a variety of computer skills and understanding to broaden a creative IT experience. This is a three-part course; there are two control assessment elements and an exam unit. This is an exciting and engaging course that covers a range of practical and creative uses of IT designed to better-prepare students and equip students for a changing future in the ICT field of work. Work is assessed through a mixture of designing and creating digital products, presentations and written assignments.

**Unit 1. Exploring user interface design principles and project planning techniques**  
(Internally assessed and externally moderated)  
Students will develop their understanding of what makes an effective user interface and how to effectively manage a project. They will use this understanding to plan, design and create a user interface.

**Unit 2. Collecting, presenting and interpreting data**  
(Internally assessed and externally moderated)  
Students will understand the characteristics of data and information and how they help organisations in decision making. They will use data manipulation methods to create a dashboard to present and draw conclusions from information.

**Unit 3. Effective digital working practices**  
(Externally assessed)  
Students will explore how organisations use digital systems and the wider implications associated with their use.

*“ I am doing the GCSE IT course, it is allowing me to learn and develop a wide range of website skills. I did this course because I like IT in general and I wanted the chance to do the creative website things. ”*

# Programme of Study Key Stage 4



## GCSE Computer Science

There are two aspects to this course; Computer Systems and Computational thinking, algorithms and programming. Both of which are tested by two 90-minute papers.

**Paper 1, Computer systems**, examine students on their knowledge of how the hardware and software of a computer system work and interact. Particular attention is paid to the CPU and networks.

**Paper 2, Computational thinking**, algorithms and programming, focuses on the computational thinking skills essential for thriving in the digital world. Students are asked to write algorithms to solve problems using pseudocode or exam reference language and use computational logic.

The content of each paper is taught side-by-side to provide opportunities for interleaving, while the content of both papers is supported by practical programming experience and tasks throughout the course.

## BTEC Digital Information Technology

Currently only being studied in Year 11. This is an exciting and engaging course that covers a range of practical and creative uses of IT designed to better-prepare students and equip students for a changing future in the ICT field of work.

The UK is a world leader in the creative digital industries, such as in the creation of visual effects for the design of interactive interfaces. However, there is growing recognition that we **need to build on and improve the UK's capability** and capacity for technical innovation and creativity in this area.

The course is a Level 2 qualification GCSE equivalent. This course has been designed to engage and enthuse young people with an interest in creative computing, for example, the design and use of user interfaces in our world. The course comprises of three-parts, there are two control assessment elements and an exam unit.

The course will encourage learners to consider pursuing education, training and career paths, **which will contribute to the nation's economic well-being** while achieving job satisfaction and rewards in the ICT industry.



# Assessment Plan for Key Stage 4

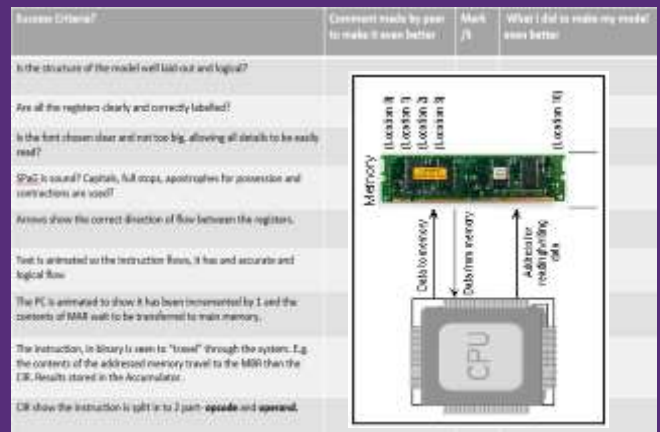
## Computer Science- Paper 1

Component 1 content will primarily be assessed in class through a combination of completing **students' workbooks and end of topic assessments**. Students will complete end of term topic quizzes using OCR resources. Technical terminology and key word definitions will be regularly tested using online learning platforms like Quizlet live in class. Homework will comprise of flipped learning activities using online videos to explain key concepts that will be explained further in class. Exam questions will be used regularly to inform pupil progress.

## Computer Science- Paper 2

Programming skills will be taught through short challenges that will build understanding of algorithms and computational thinking. Students will use the PRIMM approach (Predict, Run, Investigate, Modify and Make) to build up programming skills. Technical terminology will be regularly tested using online platforms like Quizlet in class. Homework will comprise of completing assignments using Seneca to remember topics better.

PPEs in both Years 10 and 11 help prepare our students for the demands of the final exam.



## BTEC Digital Information Technology

### Unit 1

Students will develop their understanding of what makes an effective user interface and how to effectively manage a project. They will use this understanding to plan, design and create a user interface.

### Unit 2

Students will understand the characteristics of data and information and how they help organisations in decision making. They will use data manipulation methods to create a dashboard to present and draw conclusions from information.

### Unit 3

Students will explore how organisations use digital systems and the wider implications associated with their use. Students will have 4 hours per week class time with weekly **homework's** to test and reinforce key vocabulary and understanding. Online learning platforms such as Seneca learning and Quizzes are used. Students use personal learning checklists to best prepare for end of unit tests. Furthermore, PPEs in both Years 10 and 11 help prepare our students for the demands of the final exam.

# Literacy in IT & Computing

Students are provided with a list of keywords for each topic and are given regular spelling and explanation tests to embed these words.

Students are also taught how to find and fix errors in their programming, which requires learning a completely new syntax.

Students are taught how to compose answers to longer questions which expect high levels of literacy.



# Numeracy in IT and Computer Science

Students learn about number bases, specifically binary and hexadecimal. They learn how to manipulate numbers in these bases and how to convert between different number bases.

Students learn to use mathematical operators and formulas in programming and data analysis, including some not covered in maths lessons and use logic gates to create solutions. Students also learn about unit sizes and perform calculations around file sizes and required storage amounts.

# Raising aspirations in IT and Computer Science

Each unit at KS3 is designed to inform students about the technology jobs available and to develop the knowledge and skills required to peruse one of these jobs. The skills in Python coding they develop are in high demand in many areas, such as software design, game design and computer control. While the photo and video editing units open up the world of graphic design and the creative industry to students. Many of our students go on to be very successful at 6<sup>th</sup> form and university.

# Broadening horizons in IT & Computing

All students will work with industry-standard software and learn skills applicable to real jobs but more importantly, students learn about the jobs available and companies operating in the local area and beyond. Students will receive video messages from people working in the industry to hear about their experiences and the advice they would give. Every year we take part in the international drive called "Hour of Code." Last year we were a part of the 810,500,000 students who took part in the event from over 180 different countries across the world.





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