

## DOROTHY STRINGER SCHOOL

### COMPUTER SCIENCE – CURRICULUM INTENT

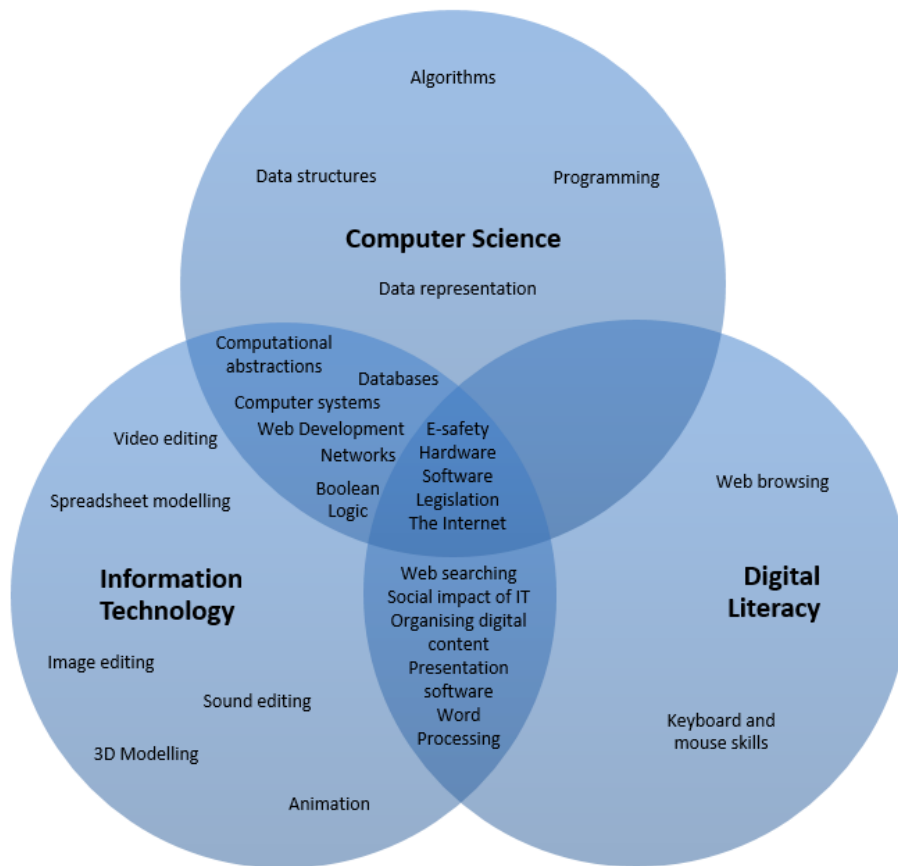
#### *From users of technology to creators of technology*

Our department is in a state of transition as we move from students seeing themselves as users of technology to creators of technology.

Being a digital native and a mere user of technology is not enough. Technology is changing at such a rapid pace that in order to thrive and succeed in the Information Age, we need to understand how computers work. Our primary aim is to transform our students from users of technology into creators of technology by giving all our students the opportunity to think, create, persevere and grow.

From nanotechnology to synthetic biology, from wearable technology to self-driving cars, Computing will continue to shape the future that we live in. Computing teaches us how to solve problems by breaking them down into manageable components. In developing our own original solutions, Computing requires us to be both logical and creative. Computing enables us to develop a skillset and mindset which will be useful in practically every other discipline.

Within the **National Curriculum**, Computing as a subject can be defined as a combination of three separate strands; Computer Science, IT and Digital Literacy.



The National Curriculum for Computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology

#### **Our Aims**

- Create an environment in which all pupils enjoy Computing and feel they can do well in Computing.
- Create well-rounded users and creators of Computer technology with a focus on independent problem-solving skills.
- Engage pupils and expose them to a wide range of Computing skills which will empower them in whatever career path they choose.

#### **Mindset Shift**

Our students frequently ask, 'Are we going on the computers?' as they enter the Computer Science Lab. Computing lessons are focused on the need to shift students' mindsets from 'doing' to thinking and problem-solving, related to real world issues. We want students to come to lessons thinking about how they can use computers to solve problems.

**COMPUTING – CURRICULUM MAP – 2019/20**

<b>7</b>	<p><b>Introduction and SLG Admin</b>  <b>Microsoft Skills – Word and Powerpoint</b>  <b>e-Safety</b></p>	<p><b>Introduction to programming (I)</b>  Scratch</p>	<p><b>Introduction to networks</b>  <b>e-Safety</b>  Safer Internet Day</p>	<p><b>Microsoft skills – Excel</b>  (Link with Maths)  <b>Introduction to HTML</b></p>	<p><b>Computer Systems</b>  <b>Introduction to Programming (II)</b>  Python</p>	<p><b>Problem-Solving</b></p>
<b>8</b>	<p><b>Computational Thinking</b>  Recipe App  Javascript</p>	<p><b>Computational Thinking</b>  Recipe App  Javascript</p>	<p><b>Geolocation</b>  <b>e-Safety</b>  Safer Internet Day</p>	<p><b>Computer Systems</b>  <b>Efficient Programming</b>  Python</p>	<p><b>Efficient Programming</b>  Python  HTML (II)</p>	<p><b>Problem-Solving</b></p>
<b>9</b>	<p><b>Validity and Bias Online</b>  Smart Searching  Fake News</p>	<p><b>App Challenge</b>  Create an app, develop a prototype (Javascript) and a marketing campaign</p>	<p><b>App Challenge</b>  Presentation to Peers  Top 10 pitch to panel of digital professionals  <b>Year 9 Options Selection</b>  <b>e-Safety</b>  Safer Internet Day</p>	<p><b>Computer Systems</b>  <b>Efficient Programming</b>  Python</p>	<p><b>Computer Systems</b>  <b>Data Representation</b>  Binary  ASCII  Images  Sound</p>	<p><b>ICT Skills</b>  Getting the best out of Microsoft Office and Photoshop  <b>GCSE Taster</b>  Business  Computer Science  Creative iMedia</p>
<b>10</b>	<p><b>Section 1</b>  Systems architecture</p>	<p><b>Section 1</b>  Memory  Storage  <b>Section 5</b>  Alogirthms</p>	<p><b>Section 5</b>  Alogirthms  <b>Section 4</b>  Ethical, Legal, Cultural and Environmental concerns</p>	<p><b>Section 5</b>  Pseudocode  <b>Section 6</b>  Programming</p>	<p><b>Section 6</b>  Programming  <b>Section 7</b>  Logic and languages</p>	<p><b>Data Representation</b>  Binary  ASCII  Images  Sound  Compression</p>
<b>11</b>	<p><b>Programming Project</b>  <b>Section 1</b>  SA, Memory, Storage</p>	<p><b>Programming Project</b>  <b>Section 2</b>  Wired and wireless networks</p>	<p><b>Section 3</b>  Systems Software and security</p>	<p><b>Section 4</b>  Recap</p>	<p><b>GCSE Revision</b></p>	<p><b>GCSE Revision</b></p>

### **Transition from KS2 to KS3**

Year 7 students join the school with differing experiences of technology and programming, depending on which junior school they attended.

The majority of students are no longer familiar with the file structure of a PC, nor do they have mouse and keyboard skills. A reflection of the touch screen generation which they are part of nowadays.

Few have any appreciation of the problem solving skills required to be a computer scientist.

At KS3 we teach both theoretical and practical lessons to address these issues. Students gain an understanding of computer science and the theories behind the machines we use. On a practical level they develop the ability to analyse problems in computational terms through decomposition, abstraction and algorithmic thinking and create programs to solve such problems. Initially using block based programming as most are familiar with Scratch, before moving onto look at text based programming languages such as HTML and JavaScript. This year we are introducing Python and moving away from KidsRuby. Python is becoming the standard requirement for formal examinations since it is highly regarded across the industry.

### **Transition from KS3 to KS4**

In the final year of KS3 we introduce all our Y9 students to the 3 GCSEs offered by the department, through the App Challenge. Students gain a valuable insight into the System Design and Marketing processes which real businesses follow and if successful, go on to meet developers from local App Development companies. By studying Python in KS3 students are prepared for their Computer Science GCSE. This is particularly relevant for our next Y10 GCSE cohort (Sept 2020) as OCR have changed their pseudocode to match Python.

The GCSE gives students a deeper theoretical understanding of the background to computer systems by looking at components, systems and how they work. From a practical point of view they are able to further develop their analytic, problem solving, design and computational thinking skills. All complete a 20 hour programming project where they must design and implement a programme to solve a problem. Students use testing and evaluation to improve and develop their programs. Students study the wider implications of technology to society and the environment, as well as considering the ethical, moral and legal implications.

### **Transition from KS4 to KS5**

Many of our Year 11 students go on to the local sixth form colleges to continue their love of the subject by taking either A Level Computer Science, BTEC Computer Science and/or BTEC ICT. Switching to Python as our main programming language at KS3 and KS4 will allow for a smoother transition to these courses.