

# IDSALL SCHOOL

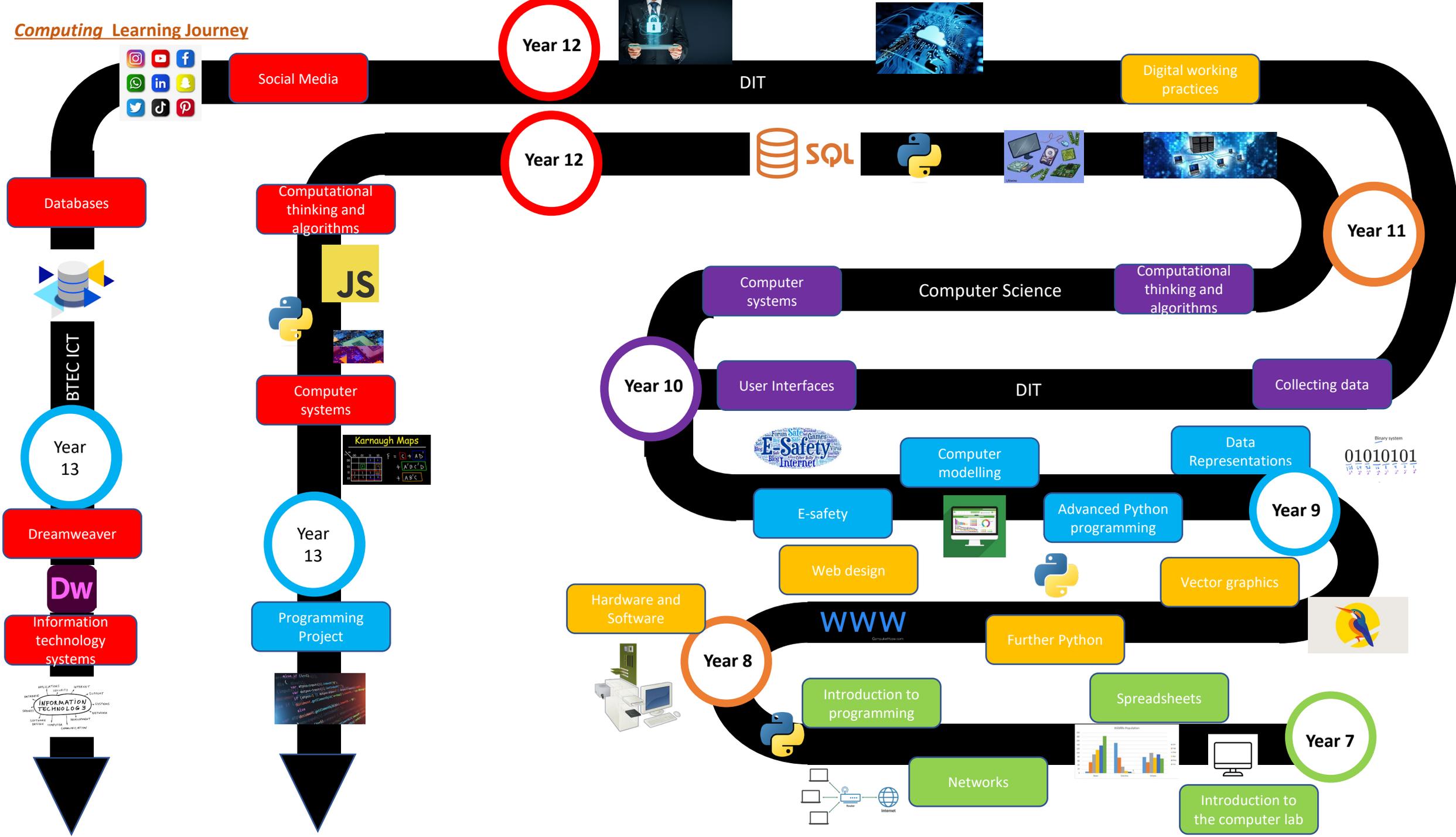
## Digital Curriculum

Our Vision for Computer Science and IT:

- Computer Science and IT are central to life in the modern world. Regardless of a student's chosen vocation, technology will play a central to their day-to-day activities.
- The computer Science curriculum at Idsall School intends to arm students with the practical skills and technical knowledge that will enable them to thrive in the workplace. Students will gain an understanding of how their devices work and how to use them effectively and safely. Through studying programming, students will develop their logical and problem-solving skills which they can take forward and apply to new learning experiences.



# Computing Learning Journey



**The Big Picture- Intent:**

Y7 Computing is an exciting subject for many students. Students are introduced to the school network, with a brief overview of how it functions and what safeguarding principles are built into it. The introduction to the network enables students to access resources on a cross curricular basis and introduces students to the various systems that will be routinely used by students. Students will study data modelling through a spreadsheets unit, enabling them to apply mathematical and technical skills in data analysis. Students will gain an understanding of networking, and explore how networking protocols have enabled the creation of wide area networks. Students will build upon knowledge of algorithms delivered in KS2 and will be introduced to a text based programming language – Python. This unit is the basis for two further units delivered in years 8 and 9 and teaches students to apply decomposition and sequencing skills to problem solving.

All students will be able to access the main content of all lessons and all students will be taught to the top with scaffolding, adaptive teaching and stretch and challenge provided where necessary.

**Implementation:** There are four units delivered in year 7.

**Collaborating online respectfully:** A primer for learners on how to use the school network appropriately. This unit builds in time for teacher-led discussions on why appropriate usage is important, as well as allowing for opportunities to highlight online safety issues.

**Modelling data:** Learners are introduced to the wonderful world of spreadsheets and the concept of cell referencing. They will analyse data using functions and formulae and use sorting and filtering techniques to speed up retrieval.

**Networks:** Students will learn what a network is and the relative merits and drawbacks of networking computers. Students will then understand how networking different devices, made in different countries by different manufacturers is possible because of the use of protocols

**An introduction to python:** Building upon knowledge of block based programming in KS2, students will learn how the skills an concepts from KS2 can be applied to a text based programming language.

Lessons follow a consistent format beginning with a retrieval practice activity in the form of Revise, Recap, Review. This will normally involve students answering 3 questions from last lesson, followed by 2 questions from previous study and one more challenging question. Each activity will involve students being posed questions interleaved over multiple units delivered throughout the year. Students are encouraged to work independently through the provision of scaffolding where required. Computing lessons often involve the application or practical/technical skills. These will be modelled to students using the I do, we do, you do approach. Students will be assessed at the end of each unit. Following assessment, students will complete a follow up activity based upon the individual areas to be improved that have been identified.

**Key Summative Assessments:**

End of unit assessments after each unit

End of year summative assessment

Retrieval homework.

Live marking and low stakes quizzing

**Autumn Term:**

Collaborating online respectfully

**Spring term:**

Networks

Spreadsheet modelling

**Summer Term:**

Programming in Python

**Impact:** Students will know how to ensure they are safe when using online services. Importantly, students will know what to do if they do have an online concern and how to report this effectively. Students will gain an understanding of how spreadsheets can be utilised in real world situations and gain an how these can be used to increase efficiency and accuracy when looking at large amounts of data. Students will gain an understanding and appreciation as to how many of the services they interact with each day actually work, and how data can travel vast distances in doing so. Students will learn to think – They will increase their problem solving and analytical skills through learning to program in a text based language.

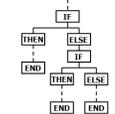
*Students will know more, and remember more through the delivery of regular retrieval practice*

<p align="center"><b>Content</b></p>	<p align="center"><b>Disciplinary Knowledge (Skills)</b> This is the actions taken within a topic to gain substantive knowledge</p>	<p align="center"><b>Substantive Knowledge</b> This is the specific, factual content for the topic, which is connected into a careful sequence of learning.</p>	<p align="center"><b>Prior Learning (Y6)</b></p>	<p align="center"><b>Future learning (Y8)</b></p>
<p><b>Collaborating online respectfully</b></p>	<ul style="list-style-type: none"> <li>• Selecting a suitable password based upon best practice</li> <li>• Sending, responding and forwarding emails</li> <li>• Appropriate Use of CC and BCC</li> <li>• Effective use of constructive criticism in improving student work</li> <li>• Creation of online collaborative documents</li> <li>• Audience considerations when designing presentations</li> <li>• Delivery of presentations to the group</li> </ul>	<ul style="list-style-type: none"> <li>• Authentication</li> <li>• Safety in computing labs</li> <li>• Respectful communication</li> <li>• Emails</li> <li>• E-safety and cyber bullying</li> <li>• Presenting to an audience</li> <li>• Reporting concerns</li> <li>• Privacy settings</li> </ul>	<ul style="list-style-type: none"> <li>• Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</li> <li>• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>	<ul style="list-style-type: none"> <li>• Vector graphics</li> </ul>
<p><b>Modelling data</b></p>	<ul style="list-style-type: none"> <li>• Accurately use cell referencing to apply formatting to specific ranges of cells in excel</li> <li>• Create basic formulae to perform arithmetic in excel</li> <li>• Make use of built in functions in excel to determine max, min, average, counta, countif and sum for cell ranges</li> <li>• Collect primary data</li> </ul>	<ul style="list-style-type: none"> <li>• Cell referencing</li> <li>• Fill and formatting tools</li> <li>• Formulae</li> <li>• Primary and secondary data</li> <li>• Functions in excel</li> <li>• Filtering</li> <li>• Sorting</li> <li>• Conditional formatting</li> <li>• Charts and graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Collecting, analysing, evaluating and presenting data and information</li> </ul>	

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning.	Prior Learning (Y6)	Future learning (Y8)
<b>Networks</b>	<ul style="list-style-type: none"> <li>To be able to articulate what is meant by the term network and provide examples</li> <li>Explore how protocols enable the compatibility of different devices</li> <li>Approximate bandwidth requirements for a given task</li> <li>Show contents of packets and how multiple packets can be used to send information</li> <li>Demonstrate an understanding of the role of a router in the creation of the internet</li> </ul>	<ul style="list-style-type: none"> <li>Network definition</li> <li>Protocols</li> <li>Network hardware</li> <li>Wired, wireless and cellular networks</li> <li>Bandwidth</li> <li>The internet as a WAN</li> <li>Packet switching</li> <li>Internet services/internet of things</li> <li>The world wide web</li> <li>Browsers, search engines and domains</li> </ul>	<ul style="list-style-type: none"> <li>Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Representations</li> </ul>
<b>An introduction to programming</b>	<ul style="list-style-type: none"> <li>Be able to output messages to the console</li> <li>Create a program in a block based language and duplicate it in a text based language</li> <li>Understand the purpose of and interpret pseudocode</li> <li>Understand the concept of a variables and utilise them to store values</li> <li>Use casting effectively</li> <li>Use simple arithmetic operators in a program</li> <li>Use error messages to debug programs</li> <li>Use selection in association with comparison operators to control the flow of programs</li> </ul>	<ul style="list-style-type: none"> <li>Inputs and outputs</li> <li>Pseudocode</li> <li>Variables</li> <li>Casting</li> <li>Arithmetic</li> <li>Errors and debugging</li> <li>Comparison operators</li> <li>Selection</li> </ul>	<ul style="list-style-type: none"> <li>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> </ul>	<ul style="list-style-type: none"> <li>More python</li> </ul>



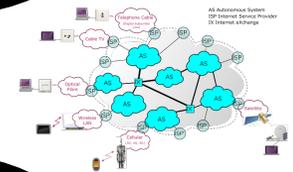
python  
powered  
`print("Hello, world!")`



Block based coding  
Text based coding in python  
Variables  
Inputs  
Outputs  
Selection

Programming in Python

What is a network?  
Hardware  
Protocols  
Wired and wireless networks  
The internet



Networks

Graphs and charts  
Referencing  
Formatting  
Lookups  
Functions/Formulae



Spreadsheets

Basic operations  
Collaborating respectfully  
E-safety



Introduction to the network



**The Big Picture- Intent:**

During year 8, students will discover what hardware and software are and discover how hardware functions within the computer system. This will enable them to gain an understanding of the common components found within all types of computers. Building upon content taught in year 7, students will apply their understanding of WWW technologies in designing and creating webpages using HTML and CSS. This will give students a deeper understanding of how the services they utilise on a daily basis are created. Building upon knowledge gained in year 7, students will further develop skills in python programming. The basics will be revisited before delving into more complex problems and introducing more advanced techniques. Students will explore the use of vector graphics and how these differ from raster images. This will give students the opportunity to use computers in a creative manner to produce projects for an intended audience. Students will learn how data is represented in binary and how to perform operations on binary numbers. This will combine mathematic and logical skills. All students will be able to access the main content of all lessons and all students will be taught to the top with scaffolding, adaptive teaching and stretch and challenge provided where necessary.

**Implementation:** There are 5 units delivered in year 8.

**Hardware and software:** Students will take a look ‘under the hood’ of a computer system and discover the role of common computer components. Students will look at how hardware and software must interact in unity to create a computer system.

**Developing for the web:** Students will explore the technologies behind the WWW and develop their own websites using HTML and CSS. Students will consider relevant legislation concerned with the development of websites before exploring how search engines are used to find pages on the WWW.

**More Python Programming:** Building upon basic knowledge introduced in year 7, students will delve deeper into the world of text based programming. Students will solve more complex problems and be introduced to new concepts such as iteration and Boolean operators

**Vector graphics:** Students will undertake a creative project by producing vector graphics. Students will explore the difference between vector and raster images

**Data Representations:** Students will explore how all data on computers is represented in binary. Students will study how electrical signals can be used to represent binary number systems and will be able to perform simple operations on binary numbers  
 Lessons follow a consistent format beginning with a retrieval practice activity in the form of Revise, Recap, Review. This will normally involve students answering 3 questions from last lesson, followed by 2 questions from previous study and one more challenging question. Each activity will involve students being posed questions interleaved over multiple units delivered throughout the year. Students are encouraged to work independently through the provision of scaffolding where required. Computing lessons often involve the application or practical/technical skills. These will be modelled to students using the I do, we do, you do approach. Students will be assessed at the end of each unit. Following assessment, students will complete a follow up activity based upon the individual areas to be improved that have been identified.

**Key Summative Assessments:**

End of unit assessments after each unit

Retrieval homework.

Live marking and low stakes quizzing

**Autumn Term:**

Hardware and software

Developing for the web

**Spring term:**  
 more python programming

**Summer Term:**

Vector graphics

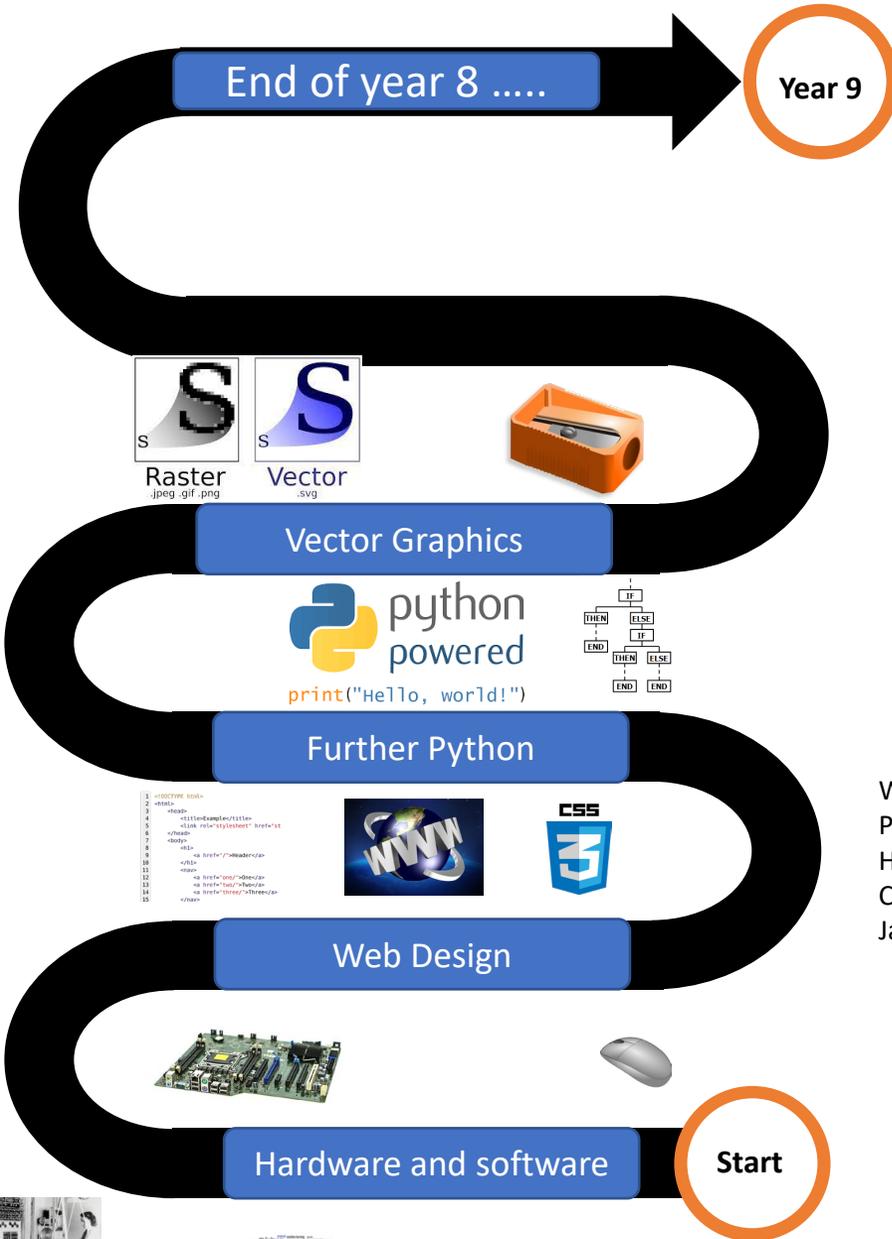
Data representations

**Impact:** Students will know the main components present in all computer systems. This will lead to an understanding of how all computer systems operate and factors that may affect their performance. Students will be able to apply new knowledge in a practical application and use this to create webpages and websites. This will enable students to have an understanding of how webpages are rendered and how they are able to be viewed on multiple devices. Students will be able to increase their knowledge of programming techniques and apply these to more complex problems. Students will build upon producing more efficient solutions to problems. Students will have the opportunity to use computers in a more creative pursuit by producing vector based graphics. This will give students an understanding of different methods of representing images in computer systems and the relative merits and drawbacks of each approach. Students will discover how different types of data are represented on the computer system and how binary and logic gates form the building blocks of all computer systems.

*Students will know more, and remember more through the delivery of regular retrieval practice*

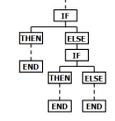
<b>Content</b>	<b>Disciplinary Knowledge (Skills)</b> This is the actions taken within a topic to gain substantive knowledge	<b>Substantive Knowledge</b> This is the specific, factual content for the topic, which is connected into a careful sequence of learning	<b>Prior Learning (Y6/7)</b>	<b>Future learning (Y9)</b>
<b>Hardware and Software</b>	<ul style="list-style-type: none"> <li>• Students will explore and be able to articulate the difference between hardware and software</li> <li>• Students will suggest suitable input and output devices for a given scenario</li> <li>• Explain the purpose of common computer components</li> <li>• Have an understanding of why computers were developed and how they differ from modern machines</li> </ul>	<ul style="list-style-type: none"> <li>• Hardware and software</li> <li>• Inputs and Outputs</li> <li>• The parts of a computer</li> <li>• Computing history and Moore’s Law</li> </ul>		
<b>Developing for the web</b>	<ul style="list-style-type: none"> <li>• What aspects make up a good website.</li> <li>• What design choices should we avoid when producing content for the needs of all users</li> <li>• Gain an understanding of licensing and how this may limit choices when gathering images</li> <li>• Use HTML tags with success manipulate the content of a webpage</li> <li>• Use CSS to give wider control and design choices to multiple pages of a website</li> <li>• Know how search engines index content for easy retrieval</li> </ul>	<ul style="list-style-type: none"> <li>• Design considerations</li> <li>• Images and copyright</li> <li>• HTML</li> <li>• Hyperlinks and images</li> <li>• CSS</li> <li>• Search engines</li> </ul>	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content	

<b>Content</b>	<b>Disciplinary Knowledge (Skills)</b> This is the actions taken within a topic to gain substantive knowledge	<b>Substantive Knowledge</b> This is the specific, factual content for the topic, which is connected into a careful sequence of learning	<b>Prior Learning (Y6/7/8)</b>	<b>Future learning (Y9)</b>
<b>More Python Programming</b>	<ul style="list-style-type: none"> <li>• Be able to handle input, output and storage of variables in the console</li> <li>• Understand the main data types in python</li> <li>• Be able to use casting effectively</li> <li>• Understand how Boolean operators can be used to check for multiple conditions</li> <li>• Use of IF, ELIF ELSE statements</li> <li>• Refine an algorithm through the use of while or FOR loops</li> </ul>	<ul style="list-style-type: none"> <li>• Inputs and variables</li> <li>• Data types</li> <li>• Boolean operators</li> <li>• Selection</li> <li>• While loops</li> <li>• FOR loops</li> </ul>		Advanced python programming
<b>Vector Graphics</b>	<ul style="list-style-type: none"> <li>• Manipulate groups of objects</li> <li>• Combine paths by applying operations</li> <li>• Using multiple tools to produce vector graphics</li> <li>• Modify an SVG file to alter a vector image</li> </ul>	<ul style="list-style-type: none"> <li>• Creating basic shapes with Inkscape</li> <li>• Grouping and paths</li> <li>• Icons</li> <li>• Producing vector graphics</li> <li>• Vector and raster graphics</li> </ul>		
<b>Data Representations</b>	<ul style="list-style-type: none"> <li>• Students know why binary numbers are integral to computing</li> <li>• Binary to decimal conversion</li> <li>• Students can identify logic gates and produce truth tables</li> <li>• Perform simple binary addition and subtraction</li> <li>• Explain how images, text and sound can be represented in binary</li> </ul>	<ul style="list-style-type: none"> <li>• Binary</li> <li>• Binary/decimal conversions</li> <li>• Logic gates and logic circuits</li> <li>• Binary addition and subtraction</li> <li>• Text, image and sound representation</li> </ul>	Hardware and software	



Vector vs Bitmaps  
Shapes  
Paths  
Icons

Recap the basics  
Selection  
Iteration  
String Manipulation  
Data types  
Boolean Operators

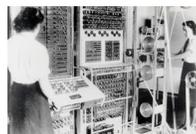


```
1 <!--DOCTYPE HTML-->
2 <html>
3 <!--head-->
4 <title>Example website</title>
5 <link rel="stylesheet" href="st
6 </head>
7 <body>
8 <h1>
9 <p>
10 </p>
11 </h1>
12 </p>
13 </body>
14 </html>
15
```



What is a web site?  
Planning a website  
HTML  
CSS  
JavaScript

Hardware inside a computer  
History of the computer  
Software  
Peripherals  
Threats



**The Big Picture- Intent:**

Year 9 aims to consolidate knowledge gained in years 7 and 8. Now students have an understanding of how computers work and how they are physically connected, we explore the threats associated with networked computers. Students will then deeper their understanding of computational thinking and problem solving by completing a third programming unit in Python. This will build upon the foundation knowledge covered in previous years and embed more advanced techniques and good programming practice. Students will then undertake a spreadsheets unit of work. This cohort were unable to complete this important topic in previous years, however the application of skills in the real world is of high importance. Year 9 will conclude with e-safety, contextualised to the issues prevalent in the local area/school/age group. The aim is that students will be aware of dangers surrounding computer use with cross curricular links with ID/PSHCE.

All students will be able to access the main content of all lessons and all students will be taught to the top with scaffolding, adaptive teaching and stretch and challenge provided where necessary.

**Implementation:** There are four units of study in year 9

**Cyber security:** students will use their knowledge of networks and hardware to understand why network security is such a significant issue in society. Students will explore threats, attacks and how to defend against them

**Advanced Python:** Students will build upon their foundation knowledge of python and apply skills to ever more complex problems. Students will use sub-routines, lists, loops and create searching algorithms.

**Modelling data:** Learners are introduced to the wonderful world of spreadsheets and the concept of cell referencing. They will analyse data using functions and formulae and use sorting and filtering techniques to speed up retrieval.

•**E-safety:** Students will become aware of dangers associated with internet usage. This unit will explore issues around cyber-bullying, Coerced online child sexual abuse, Cyber-flashing, Gaming., Misinformation, Online Challenges and Pornography.

Lessons follow a consistent format beginning with a retrieval practice activity in the form of Revise, Recap, Review. This will normally involve students answering 3 questions from last lesson, followed by 2 questions from previous study and one more challenging question. Each activity will involve students being posed questions interleaved over multiple units delivered throughout the year. Students are encouraged to work independently through the provision of scaffolding where required. Computing lessons often involve the application or practical/technical skills. These will be modelled to students using the I do, we do, you do approach. Students will be assessed at the end of each unit. Following assessment, students will complete a follow up activity based upon the individual areas to be improved that have been identified.

**Key Summative Assessments:**

End of unit assessments after each unit

Retrieval homework.

Live marking and low stakes quizzing

**Autumn Term:**

Cyber security

Advanced Python

**Spring term:**

Modelling data

**Summer Term:**

E-safety

**Impact:** For many students, this will be the end of their computing studies. The impact of this KS3 curriculum is to prepare students to be digitally literate.

This means that students at Idsall School will know how to use common software packages, be able to think logically and apply this logic to real world scenarios, have an understanding of how and why the internet works and be able to use technology safely and respectfully.

<b>Content</b>	<b>Disciplinary Knowledge (Skills)</b> This is the actions taken within a topic to gain substantive knowledge	<b>Substantive Knowledge</b> This is the specific, factual content for the topic, which is connected into a careful sequence of learning	<b>Prior Learning (Y6/7/8/9)</b>	<b>Future learning (Y10)</b>
<b>Cyber Security</b>	<ul style="list-style-type: none"> <li>• Explore the differences between data and information</li> <li>• Understand what social media may collect about it's users and why</li> <li>• Research and understand how humans can be the weak link in any computer system</li> <li>• Know what a brute force attack is and why/how these can be successful</li> <li>• Understand that malware is not just viruses. Know how different types of malware act</li> <li>• Explore ways to increase network security</li> </ul>	<ul style="list-style-type: none"> <li>• Data vs Information</li> <li>• Data protection legislation</li> <li>• Social engineering</li> <li>• Hacking</li> <li>• Brute force</li> <li>• DOS/DDOS</li> <li>• Malware</li> <li>• Protection measures</li> </ul>	Networks (Y7) Hardware and Software (Y8)	Apply knowledge of cyber security in the study of OCR J277 Computer Science
<b>Advanced Python</b>	<ul style="list-style-type: none"> <li>• To confidently use variables, inputs and printing, selecting the most appropriate data type</li> <li>• To be able to use if, elif, else statements and nest these where required</li> <li>• To be able to use condition controlled iteration in a program</li> <li>• To be able to use count controlled iteration in a program</li> <li>• To understand when to select between count/condition controlled loops</li> <li>• To eb able to use functions and procedures routinely in programs and understand the benefits</li> <li>• To know why searching algorithms are important and to create a simple searching algorithm in python</li> </ul>	<ul style="list-style-type: none"> <li>• Variables, inputs and printing</li> <li>• Selection</li> <li>• Lists</li> <li>• Looping – WHILE</li> <li>• Looping – FOR</li> <li>• Sub programs</li> <li>• Searching algorithms</li> </ul>		

Content	<b>Disciplinary Knowledge (Skills)</b> This is the actions taken within a topic to gain substantive knowledge	<b>Substantive Knowledge</b> This is the specific, factual content for the topic, which is connected into a careful sequence of learning	<b>Prior Learning (Y6/7/8/9)</b>	<b>Future learning (Y10)</b>
<b>Spreadsheets</b>	<ul style="list-style-type: none"> <li>• Accurately use cell referencing to apply formatting to specific ranges of cells in excel</li> <li>• Create basic formulae to perform arithmetic in excel</li> <li>• Make use of built in functions in excel to determine max, min, average, counta, countif and sum for cell ranges</li> <li>• Collect primary data</li> </ul>	<ul style="list-style-type: none"> <li>• Cell referencing</li> <li>• Fill and formatting tools</li> <li>• Formulae</li> <li>• Primary and secondary data</li> <li>• Functions in excel</li> <li>• Filtering</li> <li>• Sorting</li> <li>• Conditional formatting</li> <li>• Charts and graphs</li> </ul>	collecting, analysing, evaluating and presenting data and information	Spreadsheets feature on the BTEC DIT 2022 specification
<b>E-safety</b>	<ul style="list-style-type: none"> <li>• Students understand what is meant by cyber-bullying and how to report concerns</li> <li>• Students gain an understanding of and ability to identify coercive behaviour</li> <li>• Exploration of legislation and motivation around cyber flashing</li> <li>• Students will explore the benefits of gaming as well as the dangers/negative impacts and behaviours gaming can lead to</li> <li>• Students will explore what is misinformation and disinformation and why this has become such an issue</li> <li>• Students will be able to identify the dangers surrounding online challenges</li> <li>• Students will understand the negative impact online pornography can have and how this can lead to misconceptions, support toxic masculinity and affect behaviours</li> </ul>	<ul style="list-style-type: none"> <li>• Cyber-bullying</li> <li>• Coerced online child sexual abuse</li> <li>• Cyber-flashing</li> <li>• Gaming</li> <li>• Misinformation</li> <li>• Online Challenges</li> <li>• Pornography.</li> </ul>	SRE program	ID/SRE program

