SUSSEX LEARNING TRUST

Computer Science Learning Journey Year 10

CHICHESTER CFS FREE SCHOOL

Subject Overview

This year is used as an introduction and consolidation of not only some of the theory of Computer science but also coding skills in python as they will be expected to be able to understand and interrogate coding scenarios by the beginning of year 11, when the new scenario is published for their online exam.
The year starts with an emphasis on the theory of Computer Science but as students' progress, the key theories then feed into the skills-based aspects of the qualification as students first understand the '**what and why**' of computer science, before they later learn the '**how and why**'.

Temperance Term

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	HALF TERM
Topic	**1. 11 – Professsional Standards** **1.1 Hardware** **1.8 Algorithms and Constructs** **2 - Implementation**			**1.2. Logical Operators** **1.8 Algorithms and Constructs** **2. Implementation**		**1.3 Networking and Cybersecurity** **1.5. Data Organisation** **1.8 Algorithms and Constructs** **2 - Implementation**			
Challenge Objective and Content (for all learners)	• Formal and informal codes of ethical behavior and conduct in computer science • Essential Hardware and Architecture • Embedded Systems • Designing, writing, testing and refining Python 3 code – Focusing upon Variables, Sequence, Selection and Iteration. To stretch and challenge students will complete More complex coding constructs, investigation and implementation tasks.			• Logical Operators and Boolean Logic • Design, write, test and refine Python 3 code – Focusing upon1 designing Functions To stretch and challenge students will complete complex logical diagram creation and Boolean notations.		• Network characteristics, topologies, hardware and protocols • The purpose of the Internet, DNS and URL's • Threats to cybersecurity and protection against these threats • designing, writing, testing and refining Python 3 code – Focusing upon using functions and arrays To stretch and challenge students will complete complex algorithms using both pseudocode and python coding.			
Inspire Opportunities	Physical hardware components will be investigated, students will get a hands-on approach to their learning through the medium of assembling hardware components and seeing what happens "under the hood". Career related real world context research/questions to inspire students to broaden their understanding of computer science within their own environment.								
Assessment Opportunities	Formative assessments throughout utilising MCQ and google forms. End of topic summative assessments.								

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	CHRISTMAS
Topic	**1.4 - Data Representation**			**1.8 Algorithms and Constructs** **2 - Implementation**	**1.4 - Data Representation** **2 - Implementation**		

Challenge Objective and Content (for all learners)	• Data Types and the use of data types in python. • Representation of numbers – Binary Conversions, Addition, Subtraction, Positive and Negative integers using two's compliment, sign and magnitude representation. & Arithmetic Shifts. Data representation tasks will increase in complexity and detail, the use of twos compliment and number bases. • Hexadecimal conversions • Underflow and overflow.	• Designing, writing, testing and refining Python 3 code – Focusing upon combining the use of Variables, Sequence, Selection, iteration and the design as well as use of functions. This will include discussions and tasks on parameters, how and when these are used to stretch students' understanding.	• Representation of characters • Representation of graphics • Representation of sound • Storage requirements • Compression These theory elements will be Implemented through the creation of coded solutions to stretch and challenge	
Inspire Opportunities	Students will research what the number bases are specifically used for and conduct their own checks into conversions for colours, emoji's and logical representations.	Students will interrogate code that has already been constructed so they are able to see the trajectory of what they will be aspiring to complete by the end of the course.	Students will create code that will complete the conversations and calculations for them once they have learnt about the calculations themselves. This will inspire students to create coded solutions to theoretical aspects of computer science.	
Assessment Opportunities	Formative assessments throughout utilising MCQ and google forms. End of topic summative assessments.			

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Justice Term

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	HALF TERM
Topic	**1.5 Data Organisation** **2 - Implementation**	**2 – Investigation & Design**		**1.8 Algorithms and Constructs** **2 – Implementation & Design**	**2 – Testing** **1.8 Algorithms and Constructs**	**2 - Refinement**	
Challenge Objective and Content (for all learners)	• Designing, writing, testing and refining Python 3 code – Focusing upon introduction data structures • Understanding file design and the choice of appropriate files and records Implementation of theory by creating coded solutions that increase with difficulty to challenge all.	• Computational thinking • Meeting a set of requirements • designing and documenting input and output facilities for effective user interfaces • Introducing pseudo code Implementation of theory by creating coded solutions that increase with difficulty to challenge all.		• Designing, writing, testing and refining Python 3 code – Introducing GUI's using Tkinter Investigation of already coded segments for refinement and modification, leading into creating their own coded solutions that increase with difficulty to challenge all.	• Designing effective testing strategies to ensure the final solution meets requirements. • implementing effective testing using python 3.0 • Test data types • Validation and Verification Implementation of theory by creating coded solutions that increase with difficulty to challenge all.	• Using testing strategies and implementing the outcomes to refine coding solutions. • Evaluating outcomes. • Technical terminology/concepts for the software development cycle Implementation of theory by creating coded solutions that increase with difficulty to challenge all.	
Inspire Opportunities	Discussions into ethical and unethical practices will also take place during this section using SQL and students will be able to practice this also.	Computational thinking can be utilised across multiple subjects, and this will be discussed at length during this section of the curriculum, cross curricula with DT and design that meets a set of requirements as well as the introduction of pseudocode which will be discussed as a way to plan a coding project before implementation.		Career related real world context research/questions to inspire students to broaden their understanding of computer science within their own environment.			
Assessment Opportunities	Formative assessments throughout utilising MCQ and google forms. End of topic summative assessments.						

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	EASTER
Topic	**1.8 Algorithms and Constructs** **Component 2 – Consolidation of Learning outcomes**		**PLC's and Refinement week**	**1.8 Algorithms and Constructs** **Component 2 - Consolidation of Learning outcomes**	**1.11. Impacts of digital technology on wider society**		

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Challenge Objective and Content (for all learners)	• Consolidation of all elements already taught about component 2. • Introduction to On Screen Examination and how this is implemented and completed. Investigation of already coded segments for refinement and modification, leading into creating their own coded solutions that increase with difficulty to challenge all.	• Conducting PLC's and checking knowledge has been imbedded. • Recapping on weaker areas of student understanding	• Coding challenges week • Students will be continuing to consolidate learning that has taken place this year and apply this to a multitude of coding challenges depending on learning needs identified during the previous week.	• The ethical, legal, cultural, environmental and privacy issues linked to the use of computer systems. • the impact of relevant current legislation on Computer Science, including: the General Data Protection Regulation (GDPR) and Data Protection Act 2018, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988, Creative Commons Licensing, Regulation of Investigatory Powers Act 2000, Telecommunications Regulations Act 2000 & Freedom of Information Act 2000.	
Inspire Opportunities	Career related real world context research/questions to inspire students to broaden their understanding of computer science within their own environment.			Research and discussion will take place focusing on the impact of technology on wider society ending with a debate task.	
Assessment Opportunities	Formative assessments throughout utilising MCQ and google forms. End of topic summative assessments.	Feedback and refinement.		Formative assessments throughout utilising MCQ and google forms. End of topic summative assessments.	

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Courage Term

	Week 1	Week 2	Week 3	Week 4	Week 5	
Topic	**1.8 Algorithms and Constructs** **2 – Investigation & Design**				**Component 1: Revision and in class Mock exam**	**HALF TERM**
Challenge Objective and Content (for all learners)	• Understanding & interrogating methods of defining algorithms, including pseudo-code and flowcharts • writing, correcting, testing and interpreting the function of algorithms that solve problems using a range of technical strategies and tools. • Understanding the characteristics of sorting algorithms • Understanding the characteristics of searching algorithms				Recapping on concepts on component 1: theory-based aspects of the computer science GCSE. Revision time will be allocated, both directed and some independent with mock examination occurring at the end of the week	
Inspire Opportunities	Career related real world context research/questions to inspire students to broaden their understanding of computer science within their own environment.					
Assessment Opportunities	Formative assessments throughout utilising MCQ and google forms. End of topic summative assessments.				Component 1 Mock examination	

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	
Topic	**2 – Design, Investigation & Implementation**		**Component 2 exam scenario**		**Component 2 mock exam**	**Component 2: Coding Challenges**	**SUMMER**

Challenge Objective and Content (for all learners)	• Working upon and familiarising students with the Python Tkinter Library To stretch and challenge students will complete More complex, investigation and implementation tasks involving Tkinter forms and GUI's	Students will receive an exam scenario to work upon in class. This is to help familiarise the students with the content of component 2. Walking Talking Mock examination.	Students will receive an exam scenario to work upon in class. This is to help familiarise the students with the content of component 2. Completion of the Walking Talking Mock examination before continuing to a full mock examination.	Students will end the year with coding challenges which are tailored to assisst them in the area's which they found more difficult during mock examination.	
Inspire Opportunities	Career related real world context research/questions to inspire students to broaden their understanding of computer science within their own environment.				
Assessment Opportunities	Feedback and refinement.		Mock Examination	Feedback and refinement.	