Computing & ICT Year 8

Subject Vision

- Learning allows pupils to develop a range of skills to use in the real world
- The teaching of Computer Science and ICT will develop independent pupils who think logically and can create creative solutions to solve problems.
- Teaching Computer Science and ICT allows us to create future leaders who can solve problems and think critically about information. Pupils will have the opportunity to investigate different problems from the real world, come up with solutions and critique the solutions from others.
- All pupils have the right to study Computer Science and ICT as it will allow them to break down problems into sub problems, understand that every problem has many solutions and to think critically about the different solutions.
- Pupils will have opportunities to work alongside businesses to see how these skills can be used in the workplace. In a world suffused by computation, every school-leaver should have an understanding of computing and ICT.

National Curriculum KS3 Computing

Pupils should be taught to:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
- use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
- understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems

- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

National curriculum in England: computing programmes of study - GOV.UK (www.gov.uk)

End Points

EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)
EP2. Collecting, Presenting and Interpreting Data (ICT)
EP3. Effective Digital Working Practices (ICT)
EP4. Computer systems (CS)
EP5. Computational thinking, algorithms and programming (CS)
EP6. In house systems and digital safety (CS) (ICT)

Subject Domains of Knowledge	Subject Key Concepts
D1. Systems architecture D2. Memory and storage D3. Computer networks, connections and protocols D4. Network security D5. Systems software D6. Ethical, legal, cultural and environmental impacts of digital technology D7. Algorithms D8. Programming fundamentals D9. Producing robust programs D10. Boolean logic	C1. What is a user interface? C2. Audience needs C3. Design principles C4. Designing an efficient user interface C5. Project planning techniques C6. Create a project plan C7. Create an initial design C8. Developing a user interface C9. Refining the user interface

D11. Programming languages and Integrated Development Environments	

Computing & ICT Year 8

Medium Term Curriculum Plan

Year 8: Computing

Units	Unit 1: Inside the Box	Unit 2: The Next Best Thing (Spreadsheet 2)
Unit Overview	We all use computers in our daily lives but rarely stop to understand how they work. This unit looks at the key parts of a computer system to introduce the basic concepts to students. They look into the physical elements that compose a computer, moving onto binary, identifying how the internet works and beyond by programming their first HTML pages (HELLO WOLRD).	Spreadsheets impact on our daily lives but many have little understanding how they work or how they can be used to manipulate data to get meaningful results. This unit is the next step in redressing this. Formulae and functions are used to manipulate larger data sets and outcomes are presented in graphical form.
Lesson Sequence		
Key Domains and Concepts taught in this Unit / Term	D1. Systems architecture D2. Memory and storage D3. Computer networks, connections and protocols D4. Network security D5. Systems software D6. Ethical, legal, cultural and environmental impacts of digital technology D7. Algorithms D8. Programming fundamentals D9. Producing robust programs D10. Boolean logic D11. Programming languages and Integrated Development Environments	D7. Algorithms C1. What is a user interface? C2. Audience needs C3. Design principles C4. Designing an efficient user interface C5. Project planning techniques C6. Create a project plan C7. Create an initial design C8. Developing a user interface C9. Refining the user interface
KS4 End Points	EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)	EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)

SOUTH DOWNS
LEARNING TRUST

Computing & ICT Year 8

	EP3. Effective Digital Working Practices (ICT) EP4. Computer systems (CS) EP5. Computational thinking, algorithms and programming (CS) EP6. In house systems and digital safety (CS) (ICT)	EP2. Collecting, Presenting and Interpreting Data (ICT) EP3. Effective Digital Working Practices (ICT) EP6. In house systems and digital safety (CS) (ICT)
Declarative Knowledge (Students should know)	The students should know • what constitutes a computer • What is binary? • How the internet is delivered to your device • Program a simple web page in HTML	The spreadsheet unit for Year 8 builds on the work in Year 7 developing their modelling skills using more complex and larger data sets to further develop students modelling of data with a spreadsheet.
Procedural Knowledge (Students should be able to do)	• To identify the parts of a computer • How to convert Binary to denary and back again • How the internet works • Create a simple web page in HTML	• Create booking system calculate income from seat sales. • Confidently use Functions including SUM, MAX, IF and COUNTIF • Make use of cell naming, conditional formatting, validation, charting and simple macros.
Developing T3 Literacy and Numeracy	HTML, Binary, Denary , Hexadecimal, HDD, SDD, Server Router, Modem, Packets	Data, Cell, Cell Reference, Active Cell, Row, Column, Range, Select, Drag Handle, Autofill, formula, Information Source, Primary Source, Secondary Source, Chart, Pie Chart, Bar Chart, Series, Axis /Axes, Labels, Headers, Function, Maximum, Minimum, Header, Filter, Average, Criterion / Criteria, Condition, Conditional Formatting, Worksheet, Value, Label
Assessment (Summative and Formative)	Ongoing review of class notebooks verbal feedback given Test on MS forms to generate % (recorded in line with data capture) used formatively to identify any areas of misconception and addressed in tick time activities.	Ongoing review of class notebooks verbal feedback given Test on MS forms to generate % (recorded in line with data capture) used formatively to identify any areas of misconception and addressed in tick time activities.

SOUTH DOWNS
LEARNING TRUST

Computing & ICT Year 8

Links to Prior Learning	This will link to prior coding of the scratch microbits and code.org in year 7	This will link to Spreadsheets year 7
Next steps in learning	Sense of audience, further programming and identifying solutions for a client in KS4 work	There is a direct link here to The Show in Year 9. The spreadsheet skills become all important for students taking the BTec route in KS4 when they will need to use Pivot tables.
Common Barriers to learning in this unit	This may be the students' first time accessing any of this, but others may have had the opportunity beforehand	Misconceptions about spreadsheets and fear of things Maths related

Computing & ICT Year 8

Units	Unit 3: Vodafone App	Unit 4: Microbits (Y8 Part II)
Unit Overview	The Digital Creators' Challenge gets students to work in teams to devise an innovative app idea to help solve a problem in their local community. It enables students to develop their digital skills, access engaging learning content and build their knowledge of digital careers.	Building on the Year 7 unit, students continue their journey using the BBC micro:bit (a pocket-sized computer) continuing to get software and hardware working together. They will develop more complex programs, thinking about what the end user will need or desire.
Lesson Sequence		
Key Domains and Concepts taught in this Unit / Term	C1. What is a user interface? C2. Audience needs C3. Design principles C4. Designing an efficient user interface C5. Project planning techniques C6. Create a project plan C7. Create an initial design C8. Developing a user interface C9. Refining the user interface	D1. Systems architecture D2. Memory and storage D3. Computer networks, connections and protocols D5. Systems software D7. Algorithms D8. Programming fundamentals D9. Producing robust programs D10. Boolean logic D11. Programming languages and Integrated Development Environments C1. What is a user interface? C2. Audience needs C3. Design principles C4. Designing an efficient user interface C8. Developing a user interface C9. Refining the user interface
KS4 End Points	EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT) EP2. Collecting, Presenting and Interpreting Data (ICT)	EP3. Effective Digital Working Practices (ICT) EP4. Computer systems (CS)

SOUTH DOWNS
LEARNING TRUST

Computing & ICT Year 8

	EP3. Effective Digital Working Practices (ICT) EP6. In house systems and digital safety (CS) (ICT)	EP5. Computational thinking, algorithms and programming (CS) EP6. In house systems and digital safety (CS) (ICT)
Declarative Knowledge (Students should know)	Students will learn the development process of a new app from its initial inception through developing the idea to creating the app and evaluating it.	Students will use microbits to develop their understanding of programming, problem solving, giving and receiving formative feedback
Procedural Knowledge (Students should be able to do)	Students will be able to work from a project brief, to identify the assets required, to plan an overview, to use this plan to develop the app and then finally evaluate the product.	Students will be able to more complex games of increasing complexity using Microsoft MakeCode block based programming moving on to Python by the end of the unit.
Developing T3 Literacy and Numeracy	Key Words – App, problem solving grid, impact ,mass marketing, Elevator Pitch, Target Used, User profile, Minimum Viable Product (MVP), storyboard, User centred, Innovative, Curious, Creative, Collaborative, Business Savvy, Ethical, Passionate	Key Words – Variable, Abstraction, Decomposition, Event Handler, Java Script Block Editor, Scripting Language, Pseudocode
Assessment (Summative and Formative)	Ongoing review of class notebooks verbal feedback given Test on MS forms to generate % (recorded in line with data capture) used formatively to identify any areas of misconception and addressed in tick time activities. Peer and self review will play important parts here for their presentation.	Ongoing review of class notebooks verbal feedback given Test on MS forms to generate % (recorded in line with data capture) used formatively to identify any areas of misconception and addressed in tick time activities.
Links to Prior Learning	Knowledge of how apps are created, presentation software	Students may have studied in previous years software such as Logo, RoboMind, Kodu or GameMaker. The have had their first experience of scratch in KS3 also
Next steps in learning	This unit brings together a range of software and skills to create a project style unit. This leads directly into larger	They will get their first taste of Python programming this will continue to be developed throughout the KS ready for GCSE computer science.

	project based learning exercises in Year 9 and KS4 courses	
Common Barriers to learning in this unit	Teamwork can be an issue for some either due to changes in friendship groups, large or small groups.	Mind blocks and self belief are the two common barriers, we have built to this stage already though and will use familiarity and success elsewhere to break these down.

Computing & ICT Year 8

Units	Unit 5: AI and Machine Learning	Unit 6: Computer Science Discoveries Code.org (part II)
Unit Overview	AI - Science Fiction or Science Now, students will look at the early days of AI and how the railway failed brake dilemma still holds for today's self-driving cars. This leads on to how machines learn.	Building on the Year 7 coding this unit Computer Science Discoveries, students will create computer programs, further developing problem-solving skills, and work through fun challenges! Make games and creative projects to share with others.
Lesson Sequence		
Key Domains and Concepts taught in this Unit / Term	D1. Systems architecture D2. Memory and storage D3. Computer networks, connections and protocols D6. Ethical, legal, cultural and environmental impacts of digital technology D7. Algorithms D8. Programming fundamentals D9. Producing robust programs D10. Boolean logic D11. Programming languages and Integrated Development Environments C1. What is a user interface? C2. Audience needs C3. Design principles	Code.org D1. Systems architecture D2. Memory and storage D3. Computer networks, connections and protocols D4. Network security D5. Systems software D6. Ethical, legal, cultural and environmental impacts of digital technology D7. Algorithms D8. Programming fundamentals D9. Producing robust programs D10. Boolean logic D11. Programming languages and Integrated Development Environments C1. What is a user interface? C2. Audience needs C3. Design principles C4. Designing an efficient user interface C5. Project planning techniques C6. Create a project plan C7. Create an initial design

		C8. Developing a user interface C9. Refining the user interface
KS4 End Points	EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT) EP2. Collecting, Presenting and Interpreting Data (ICT) EP3. Effective Digital Working Practices (ICT) EP4. Computer systems (CS) EP5. Computational thinking, algorithms and programming (CS) EP6. In house systems and digital safety (CS) (ICT)	EP3. Effective Digital Working Practices (ICT) EP4. Computer systems (CS) EP5. Computational thinking, algorithms and programming (CS) EP6. In house systems and digital safety (CS) (ICT)
Declarative Knowledge (Students should know)	Able to distinguish between facts and rules Students will know how Artificial intelligence learns	Students will use code.org site to develop their understanding of programming, problem solving, giving and receiving formative feedback.
Procedural Knowledge (Students should be able to do)	• able to identify AI dilemmas • able to explain image recognition algorithm • able to explain the Turing Test	• to create games of increasing complexity using Microsoft MakeCode block-based programming • They will work through the express course developing their skill set Learning by doing through a series of problems to solve
Developing T3 Literacy and Numeracy	Key Words - Facial recognition, fingerprint recognition, language processing, neural network, self-driving cars, sensors, embedded, camera, push button, rules, decisions, training data, machine learning, structured data, email, spam, ethics, algorithms, utilitarianism, morals, bias, bits, binary, fuzzy logic, intelligence, IQ, Turing test, Captcha, chatbots, virtual assistants, sentiment analysis, weightings.	Key Words – Variable, Abstraction, Decomposition, Event Handler, Java Script Block Editor, Scripting Language, Pseudocode Loop, Repeat, Command, Condition, Conditionals

Assessment (Summative and Formative)	Ongoing review of class notebooks verbal feedback given Test on MS forms to generate % (recorded in line with data capture) used formatively to identify any areas of misconception and addressed in tick time activities.	Tracking through OneNote, the website (formative) and
Links to Prior Learning	Ties in threads from other units	Extended the work started in Code.org (Y7 Part I). Also Links directly with previous work completed in Inside the Box, Microbits and AI and Machine Learning and aims to cement the prior learning of these units
Next steps in learning		The logic thought and systematic approach of this unit will feed into the coding requirements of HTML and Python. Providing a link into the GCSE in Computer Science
Common Barriers to learning in this unit	The way these materials are set up they are low stakes and students can work at their own pace through the materials.	Independent learning, reading and following instructions. Teacher support and immersive reader will aim to alleviate this.