**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)

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**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)

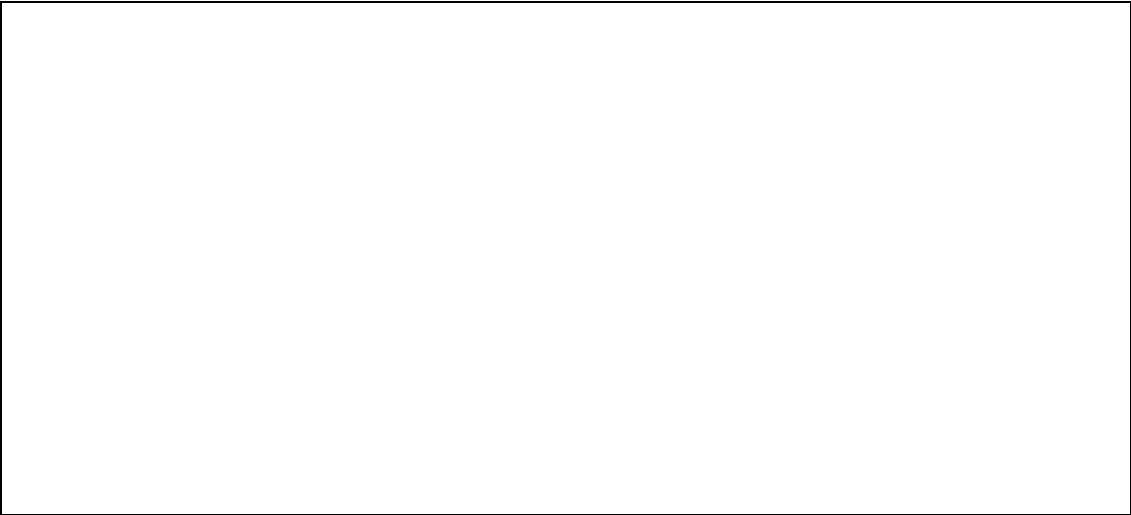EP6. In house systems and digital safety (CS) (ICT)

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

| D11. Programming languages and Integrated Development Environments | |
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**Medium Term Curriculum Plan**

## Year 9: Computing

| Units | Unit 1: Python | Unit 2: Language App |
|---|---|---|
| **Unit Overview** | Python the textual programming language to beat all languages. In fact, Python is the fastest-growing programming language today according to Stack Overflow's 2019 Developer Survey. Students will build on their block language coding skills to write their own programs without constraint, perseverance and logical thought will be tested to the limit. | Building the skills ready for the project-based work in Key Stage 4 students will identify a gap in the market, plan, storyboard and pitch for a new app that will satisfy the identified need. Then in true apprentice style mock up the app to be judged by a panel of their peers! |
| **Lesson Sequence** | | |
| **Key Domains and Concepts taught in this Unit / Term** | D7. Algorithms<br>D8. Programming fundamentals<br>D9. Producing robust programs<br>D10. Boolean logic<br>D11. Programming languages and Integrated Development Environments<br>C1. What is a user interface?<br>C2. Audience needs<br>C3. Design principles<br>C4. Designing an efficient user interface | C1. What is a user interface?<br>C2. Audience needs<br>C3. Design principles<br>C4. Designing an efficient user interface<br>C5. Project planning techniques<br>C6. Create a project plan<br>C7. Create an initial design<br>C8. Developing a user interface<br>C9. Refining the user interface |
| **KS4 End Points** | EP2. Collecting, Presenting and Interpreting Data (ICT)<br>EP3. Effective Digital Working Practices (ICT)<br>EP4. Computer systems (CS)<br>EP5. Computational thinking, algorithms and programming (CS) | EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)<br>EP2. Collecting, Presenting and Interpreting Data (ICT)<br>EP3. Effective Digital Working Practices (ICT)<br>EP6. In house systems and digital safety (CS) (ICT) |

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| **Declarative Knowledge (Students should know)** | Students will be able to create simple programs in Python in an integrated Development environment. They will be able to program random decisions as well as program logical routes through the program. They will use For and While loops to great effect. | 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. This is tied directly into Component 1 of the BTec Digital Information Technology |
| **Procedural Knowledge (Students should be able to do)** | Students will be able to create programs in Python. Which is an is an interpreted, interactive, object-oriented programming language. It incorporates modules, exceptions, dynamic typing, very high level dynamic data types, and classes. It supports multiple programming paradigms beyond object-oriented programming, such as procedural and functional programming. | 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. |
| **Developing T3 Literacy and Numeracy** | Algorthms, Python, Syntax, loops, if, elif, else, For, while, iteration, Boolean variables, Random | 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 |
| **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. |
| **Links to Prior Learning** | Links directly with skills learnt in Year 8 Vodafone App | Links directly with skills learnt in Year 8 Vodafone App |
| **Next steps in learning** | GCSE Computer Science | BTec Digital Information Technology |
| **Common Barriers to learning in this unit** | This unit is designed to challenge and ensure that the students are making the correct choices in the school's pathways. Mind blocks and self-belief are the two common barriers, we have built to this stage already | This unit is designed to help ensure that the students are making the correct choices in the school's pathways. Teamwork can be an issue for some either due to changes in friendship groups, large or small groups. |

| | though and will use familiarity and success elsewhere to break these down. | |
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| Units | Unit 3: Data Science | Unit 4: CAD (3D Sketch Up) |
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| **Unit Overview** | In this unit, students will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends. | What happens if you want to redesign a room, a house or build a skyscraper? Using 3D sketch up students will be designing their dream rooms and buildings of the future to scale. |
| **Lesson Sequence** | | |
| **Key Domains and Concepts taught in this Unit / Term** | D6. Ethical, legal, cultural and environmental impacts of digital technology<br>D7. Algorithms<br>D10. Boolean logic<br>C1. What is a user interface?<br>C2. Audience needs<br>C8. Developing a user interface<br>C9. Refining the user interface | C1. What is a user interface?<br>C2. Audience needs<br>C3. Design principles<br>C4. Designing an efficient user interface<br>C5. Project planning techniques<br>C6. Create a project plan<br>C7. Create an initial design<br>C8. Developing a user interface<br>C9. Refining the user interface |
| **KS4 End Points** | EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)<br>EP2. Collecting, Presenting and Interpreting Data (ICT)<br>EP6. In house systems and digital safety (CS) (ICT) | EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)<br>EP2. Collecting, Presenting and Interpreting Data (ICT)<br>EP3. Effective Digital Working Practices (ICT) |
| **Declarative Knowledge (Students should know)** | In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an | In this unit students use Computer Aided design to draw scale, with the aim to extend students' knowledge of what they can do with CAD. |

| | | |
|---|---|---|
| | understanding of how visualising data can help with the process of identifying patterns and trends. | |
| **Procedural Knowledge (Students should be able to do)** | Learners will go through the steps of the investigative cycle to try to solve a problem in the school using data. | They use it to design a house and rooms to scale planning their perfect hideaway |
| **Developing T3 Literacy and Numeracy** | Data science, visualisation, insight, infographic, Data, prediction, criteria, outliers, Correlation, investigative cycle, PPDAC, investigative cycle, data capture, data source, analysis, data cleansing | Application, arrowhead, attribute, block, coordinates object, scale, units of measurement, ellipse, fill, group, handles, layer, pan, zoom |
| **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. |
| **Links to Prior Learning** | Maths, History and Geography | Technology and Art |
| **Next steps in learning** | GCSE Computer Science | Computing |
| **Common Barriers to learning in this unit** | Uses big data which some find hard to take onboard, however infographics and prior knowledge drawn on to ease transition | Belief in their ability to create something meaningful, step by step induction goes a long way to support this |

| Units | Unit 5: The Show | Unit 6: iDEA ( www.idea.org.uk ) |
|---|---|---|
| **Unit Overview** | Ever wondered what goes on behind the scenes when getting a show on stage? In this project-based learning unit Students will pool their prior knowledge to design a logo, a poster and a show programme for the marketing. Then go on to design a spreadsheet to organise sales of seats for the financing and look at designing the stage and seating area using Computer Aided Design. | Looking to the future students embark on the Inspiring Digital Enterprise Award, known as iDEA. It is an international award winning programme that helps students develop digital, enterprise and employability skills. <br> This is achieved through a series of online challenges, students win career-enhancing badges that will unlock new opportunities and, ultimately, gain industry-recognised Awards that help them stand out from the crowd when applying to college and beyond |
| **Lesson Sequence** | | |
| **Key Domains and Concepts taught in this Unit / Term** | D1. Systems architecture <br> D2. Memory and storage <br> D3. Computer networks, connections and protocols <br> D4. Network security <br> D5. Systems software <br> D6. Ethical, legal, cultural and environmental impacts of digital technology <br> D7. Algorithms <br> D8. Programming fundamentals <br> D9. Producing robust programs <br> D10. Boolean logic <br> D11. Programming languages and Integrated Development Environments <br> C1. What is a user interface? <br> C2. Audience needs <br> C3. Design principles <br> C4. Designing an efficient user interface | iDEA: Develop digital, enterprise and employability skills for free. Win career-enhancing badges and gain internationally recognised awards. <br> D1. Systems architecture <br> D2. Memory and storage <br> D3. Computer networks, connections and protocols <br> D4. Network security <br> D5. Systems software <br> D6. Ethical, legal, cultural and environmental impacts of digital technology <br> D7. Algorithms <br> D8. Programming fundamentals <br> D9. Producing robust programs <br> D10. Boolean logic <br> D11. Programming languages and Integrated Development Environments <br> C1. What is a user interface? |

| | | |
|---|---|---|
| | C5. Project planning techniques<br>C6. Create a project plan<br>C7. Create an initial design<br>C8. Developing a user interface<br>C9. Refining the user interface | C2. Audience needs<br>C3. Design principles<br>C4. Designing an efficient user interface<br>C5. Project planning techniques<br>C6. Create a project plan<br>C7. Create an initial design<br>C8. Developing a user interface<br>C9. Refining the user interface |
| **KS4 End Points** | EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)<br>EP2. Collecting, Presenting and Interpreting Data (ICT)<br>EP3. Effective Digital Working Practices (ICT)<br>EP5. Computational thinking, algorithms and programming (CS)<br>EP6. In house systems and digital safety (CS) (ICT) | EP1. Exploring User Interface Design Principles and Project Planning Techniques (ICT)<br>EP2. Collecting, Presenting and Interpreting Data (ICT)<br>EP3. Effective Digital Working Practices (ICT)<br>EP4. Computer systems (CS)<br>EP5. Computational thinking, algorithms and programming (CS)<br>EP6. In house systems and digital safety (CS) (ICT) |
| **Declarative Knowledge (Students should know)** | Students learn about house styles and presentation to design a show poster and show programme.<br>They develop a simple budget / cash flow for the show and design a 3 D stage | **This unit of work enables students to hit every single end point so should be rainbow coloured. Depending on their chosen Computing path in Year 11 (GCSE Computer Science, BTec Digital Information Technology or just using ICT to support All GCSE's ) they will receive guidance on which badges to attempt**<br><br>The Inspiring Digital Enterprise Award, known as iDEA is an international award winning programme that helps you develop digital, enterprise and employability skills for free. Through our series of online challenges, students can win career-enhancing badges, unlock new opportunities and, ultimately, gain industry-recognised Awards that help you stand out from the crowd.<br>In order to gain certification you will need 50 points in each of the four categories:- |

| | | |
|---|---|---|
| | | • Citizen<br>• Worker<br>• Maker<br>• Entrepreneur<br>There are two additional sections should you wish to do the badges there:-<br>• Gamer<br>• Independent |
| **Procedural Knowledge (Students should be able to do)** | Students should be able to :<br>Create a logo, create the advertising poster for the show, create a write a multipage programme for sale at the show .<br> use a spreadsheet to model sales and effects of price changes, create a 3 d design of the stage | Suggested Computer Science badges –<br>Brain Hack, What is the cloud, Cyber Security, Esafety and online Etiquette, Social Media set up, Cyber Spies, Safe Online, GDPR, Digital Ethics, Coder Dojo, What is AI?, Working and learning from home, Problem solving with AI, Maths tools for AI, Interviews, User Interfaces, Digital Research, Projects AI project cycle, coding solutions, jquery coding, Virtual Reality, Junior Web Designer, Growth Mindset , Big Data, growth hacking , problem solving, innovation, influencer, researcher |
| **Developing T3 Literacy and Numeracy** | Logo, House style, Desk top Publishing, crop, scale, CAD, functions, formulas, spreadsheets, cells, rows, cell ref, white space, dimensions Push Pull Tool Orbit Tool | Brain Hack, What is the cloud, Cyber Security, Esafety and online Etiquette, Social Media set up, Cyber Spies, Safe Online, GDPR, Digital Ethics, Coder Dojo, What is AI?, Working and learning from home, Problem solving with AI, Maths tools for AI, Interviews, User Interfaces, Digital Research, Projects AI project cycle, coding solutions, jquery coding, Virtual Reality, Junior Web Designer, Growth Mindset , Big Data, growth hacking , problem solving, innovation, influencer, researcher |

| 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. | Each unit is assessed online as the students' progress. With enough points, they can win industry-recognised Awards, and unlock Special Achievements. |
|---|---|---|
| Links to Prior Learning | Builds on the skills learnt across all years to produce a professional looking outcome | iDEA content is made up of six categories. Citizen, Entrepreneur, Maker, Gamer, Worker and Independent. |
| Next steps in learning | Gives students the ability to link all they have learned in to completing projects. | AS indicated above this is the last unit and it is tailored to the individual and their timetable from Year 10 onwards |
| Common Barriers to learning in this unit | Realising that it is relevant to whatever they have chosen to do next year. Often subjects that are dropped in Year 9 struggle once that decision is made however this resource literally covers everything and something for everyone. | Realising that it is relevant to whatever they have chosen to do next year. Often subjects that are dropped in Year 9 struggle once that decision is made however this resource literally covers everything and something for everyone. |