Buckler's Mead Academy

Curriculum Booklet: Computing

Subject Lead: Mr Cameron

Computing Curriculum Intent:

"Whether you want to uncover the secrets of the universe or you just want to pursue a career in the 21st Century Computer programming is an essential skill to learn."

Stephen Hawking

Computing aims to prepare students for a world outside of the classroom that enables them to work and live in an environment that revolves around working with, maintaining and manipulating computer resources. Students also need to know how to be safe and work effectively with computers in a rapidly changing and developing landscape.

Our programmes of study aim to develop learner's knowledge, skills and understanding of key computational concepts and experience. We believe that all students can be successful in the world of computer and digital technology.

Our curriculum covers the following strands:
- Information Technology
- Computer Science
- Digital Literacy

These strands build on knowledge that should have been gained at KS2 including programming skills, understanding of networks , sequence selection and iteration and use of a variety of software. Our aim is to ensure that all students develop a depth of knowledge of computer science whilst building awareness and knowledge of Information Technology in the world around them.

The KS3 curriculum aims to ensure learners have sufficient knowledge to stay safe online and use computers safely in life. It also provides a focus on developing resilient learners who are able to recover from mistakes and effectively solve problems. By the end of Key Stage Three all students become able users of ICT, knowledge of how to use, interrogate and programme computers, an awareness of their digital footprint and its impact, and how to be safe in an ever changing digital climate.

Our KS4 curriculum is designed for students to develop the mind-set of a computer scientist built upon the foundations at KS3. Learners have the opportunity to develop their capability, creativity and knowledge in computer science, digital media and information technology. The courses offered enable students to choose between a course that is exam-based and one that is project-based so they can achieve the best outcomes for their learning style.

Our curriculum in both key stages prepares students for employment through problem solving skills which are considered throughout the course and getting students to use their key skills to offer solutions to some contemporary global challenges.

Computing Curriculum Implementation:

Students are taught in mixed ability groups at both KS3 and KS4, so our planning has an emphasis on providing support and challenge for all students. This is done by providing a range of differentiated activities including push it tasks for students who require stretch as well as providing extra support and scaffolding of tasks for those who require more support. We sequence the learning in our curriculum so that it becomes more complex over time starting with simpler skills or basic building blocks of knowledge and moving on to combining and layer skills to achieve a more complex outcome. Lessons are interactive with all students expected to participate and complete a wide range of activities that develop a wide range of skills.

Students are given regular opportunities to practise retrieving and applying their computing knowledge and understanding through low stakes quizzes and formal assessments. Students are also taught how to apply their knowledge and understanding to a range of skills-based, short and long written questions as appropriate for the course undertaken.

We support the school's drive on reading by supplying students with a wide range of stimulus materials to work from including reading of different text types.

Key Stage 3

A spiral curriculum is used to incrementally develop students' knowledge across the 3 components so that students can know, understand and do more in each year.

Students have access to Ambition Tasks and a workbook at any time to develop knowledge of opportunities both in the locale and further afield and as a department we have developed strong links with the Royal Logistics Corps and Thales to give our students the widest possible breadth of knowledge and options to make informed decisions about their future.

The year 9 curriculum has recently been changed to to include an Introduction to Business and how business and computing are inextricably linked so that students can make more informed choices in the Specialised Curriculum process.

Key Stage 4

Students are offered two possible routes at KS4; Creative iMedia and GCSE Computer Science. Students are guided to the appropriate course, so that their needs are met as individual learners. The course(s) delivered will depend each year on the demands of each individual cohort.

Both qualifications prepare for the next stages with regard to the Level 3 BTEC and A Level Computer Science courses.

Allocated Curriculum Time:

	Year 7	Year 8	Year 9	Year 10	Year 11
Lessons per fortnight	3	3	3	5	5

Term	Curriculum Foci	Formal Assessment
1	**Using Computers Safely** ● What is the Internet? ● What is a Search Engine? ● Understand what a Boolean Search is ● How to protect personal information ● The benefits and risks of social networks	
2	**Using Computers Safely (Cont.)** ● The effects of cyberbullying and sexting ● Bullet points summary of knowledge and skills covered **Computational Thinking** ● Using computational thinking to help solve problems ● Solving problems by decomposing them	**Using Computers Safely (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
3	**Computational Thinking (Cont.)** ● How pattern recognition can be used to identify repetitive tasks ● How abstraction can be used to solve complex tasks ● Creating effective algorithms for different tasks	**Computational Thinking (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
4	**Programming with Scratch** ● Creating sprites ● Using variables ● The purpose of repeat loops and procedures ● Randomising the behaviour of sprites	
5	**Programming with Scratch (Cont.)** ● Use of additional sprites in a game ● Adding sounds to a program **Using Micro Bits** ● Introducing the Microbit and Emulator ● Using a Makerspace project	**Programming with Scratch (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
6	**Using Micro Bits (Cont.)** ● Using and manipulating sound ● Extended project - Virtual Pet	**Using Micro Bits (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks

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Term	Curriculum Foci	Formal Assessment
1	**Digital Graphics** ● Understanding Vector Graphics ● Understanding Bitmap Graphics ● Conveying meaning in images	
2	**Digital Graphics (Cont.)** ● Effects and Enhancement ● Adding text to images **Networking** ● The structure of Internet and the World Wide Web ● How web addresses are constructed ● Protocols and how they help data communication	**Digital Graphics (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
3	**Networking (Cont.)** ● The meaning and significance of bandwidth ● what is meant by buffering and why it is used ● The difference between LANs and WANs ● The hardware used in networking ● The use of encryption to protect data	**Networking (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
4	**Programming with Kodu** ● Explore the four elements of programing, navigating, objects and worlds mean in Kodu ● Understanding that computer programs requires a precise series of instructions to operate correctly ● Learn a range of techniques to create a landscape in Kodu ● Understand about pathways in games	
5	**Programming with Kodu (Cont.)** ● Use of selection in programming in Kodu ● Using variable to track scores / lives in a game **Introduction to Python** ● Running simple Python commands ● Write, save and run extended programs in script mode ● Understanding syntax errors and how to fix them	**Programming with Kodu (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
6	**Introduction to Python (Cont.)** ● Understand data types: string, integer or float ● Using selection statements if, else and elif in a program ● Using a while loop in a program ● Generating random numbers in Python	**Intro to Python (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks

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Term	Curriculum Foci	Formal Assessment
1	**Flowol** ● Identifying the the different flowchart symbols ● Understanding the importance of sequence in algorithms ● Develop a control solution for a system that uses two flowcharts operating in sequence ● Identify common types of sensors used in control systems ● Understand how the use of subroutines can make programs more efficient	
2	**Flowol (Cont.)** ● Understand what actuators are used for in control systems ● Understand what a variable is and explain how variables can be used to control systems **Business and Branding Documents** ● To understand what a good brand image is ● To plan a brand image for a new product	**Flowol (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
3	**Business and Branding Documents (Cont.)** ● To understand the key features of a modern business card ● Introducing the key tools within an image editing software (Adobe Photoshop) ● Create the next edition of a popular magazine front cover ● Extended project - A series of adverts using a range of tools	**Business & Branding (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
4	**Introduction to iMedia** ● Sourcing and creating assets for use in a digital graphic ● Understanding technical features of graphics including: pixel dimensions, DPI and resolution ● Compile an image using basic techniques such as: Crop, move, Adding text, use of layers, use of selection tools ● Controlling the brightness and contrast of an image	
5	**Introduction to iMedia (Cont.)** ● Apply filters to a layer ● Use of adjustment layers ● Exporting graphics, including resolution, file type etc. **Machine Learning and Artificial Intelligence (AI)** ● Exploring the origin and uses of Artificial Intelligence (AI) ● The use of rules within AI decision making	**Intro to iMedia (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks
6	**Machine Learning and Artificial Intelligence (AI) (Cont.)** ● Discuss the strengths and weaknesses of machine learning ● Ethical considerations of the use of AI ● Use and techniques of facial recognition ● Exploring the Turing test ● Programming a simple chatbot	**Machine Learning (Pear Assessment)** **Time:** 45 mins **Marks:** 40 marks

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Term	Curriculum Foci	Formal Assessment
1	**Preparing for R094-Visual Identity NEA** ● Introduction to iMedia ● Media Industry Sectors ● Identifying the purpose of a graphic ● Use of Style/Layout to support a purpose ● Job roles within a design team	**R094 Assessment 1** **Time:** 45 mins **Marks:** 40 marks
2	**Preparing for R094-Visual Identity NEA (Cont.)** ● Understanding a Client Brief ● Creating graphics for a Target Audience ● Use of planning documents (mind maps, visualisation diagrams etc.) ● Use of assets, including legislation ● Repurposing graphics for a new brief ● Building skills for NEA	**R094 Assessment 2** **Time:** 45 mins **Marks:** 40 marks
3	**R094-Visual Identity NEA** ● Understanding a Client Brief ● Use of planning documents (mind maps, visualisation diagrams etc. ● Creating graphics for a Target Audience	**NEA Coursework**
4	**R094-Visual Identity NEA (Cont.)** ● Use of assets, including legislation ● Creating a range of graphics to met the requirements of a brief	**NEA Coursework**
5	**R093-Understanding Creative iMedia** ● Understanding pre-planning documents ● Exploring media distribution platforms ● Understanding the place of copyright in the media ● Understanding Health and Safety legislation	**R093 Assessment 1 (in class)** **Time:** 45 mins **Marks:** 40 marks
6	**R097-Preparing for Interactive Digital Media NEA** ● Regulation and the importance of certificates in media ● Understanding a range of media products ● The use of compression of computer files ● Bullet points summary of knowledge and skills covered	**R093 Assessment 2 (End of Y10 Exam)** **Time:** 90 mins **Marks:** 70 marks

Year 11 Level 1/2 Creative iMedia Programme of Study
Exam Board: OCR
Exam Specification: J834

Term	Curriculum Foci	Formal Assessment
1	**R097-Interactive Media NEA** ● Completing Work Plan for project ● Exploring the Client Brief ● Producing pre-planning documents ● Sourcing assets for use in product	**NEA Coursework**
2	**R097-Interactive Media NEA** ● Creating Interactive Digital Multimedia Product (IDMP) ● Exporting IDMP in appropriate file type ● Updating commentary ● Evaluating product and project	**NEA Coursework**
3	**R093-Understanding Creative iMedia** ● Exploring audience demographics ● Comparing research methods, sources and types of data ● Investigating Media codes	**R093 Assessment 3 (Mock Exam)** **Time:** 90 mins **Marks:** 70 marks
4	**R093-Understanding Creative iMedia** ● Methods for idea generation ● Documenting the design of media products ● Legal considerations in media ● The impact of different platforms for media distribution ● The properties of image, audio and moving image files	**R093 Assessment 4 (in class)** **Time:** 45 mins **Marks:** 40 marks
5	**R093-Understanding Creative iMedia** ● Revision and exam preparation	

Term	Curriculum Foci	Formal Assessment
1	**Systems Architecture** ● Components of a CPU and the Von Neumann architecture ● The purpose of registers in a CPU ● The Fetch-Execute cycle ● Factors the impact CPU performance ● Embedded systems **Programming Fundamentals** ● Python Basics (input & output)	**Systems Architecture assessment** **Time:** 45 mins **Marks:** 40 marks
2	**Memory & Storage** ● Primary vs secondary storage ● Units of storage (bits, bytes etc.) ● Storage of numbers (Binary, Hexadecimal etc.) ● Storage of text, images and sounds ● The use of compression **Programming Fundamentals** ● Use of variables	**Memory & Storage assessment** **Time:** 45 mins **Marks:** 40 marks
3	**Networks** ● Network Types & Performance ● Networking hardware and how the internet works ● Evaluation of wired / wireless networks ● The protocols used in network communication ● The 4 layer TCP/IP model **Programming Fundamentals** ● Using selection in Python (IF, THEN, ELSE)	**Networks assessment** **Time:** 45 mins **Marks:** 40 marks
4	**Network Security** ● Threats to a network from malware and hacking ● Physical security to protect networks ● Digital security to protect networks **Programming Fundamentals** ● Using iteration (loops) in Python	**Network Security assessment** **Time:** 45 mins **Marks:** 40 marks
5	**Systems Software** ● What is an operating system? ● Functions of an operating system ● Types of user interface ● Types of utility software **Programming Fundamentals** ● Handling numbers and text in Python	**Systems Software assessment** **Time:** 45 mins **Marks:** 40 marks
6	**Impact of technology** ● The cultural, environmental and ethical issues in technology ● Legislation around technology **Programming Fundamentals** ● Use of arrays	**End of Year 10 Exam** **Time:** 90 mins **Marks:** 80 marks

Term	Curriculum Foci	Formal Assessment
1	**Algorithms** ● Use of abstraction to solve problems ● Using decomposition to break down a problem ● What algorithmic thinking is ● Designing algorithms ● Comparing search algorithms ● Comparing sort algorithms **Programming Fundamentals** ● Handling files in Python	**Algorithms assessment** **Time:** 45 mins **Marks:** 40 marks
2	**Producing Robust Programs** ● Defensive design considerations ● Methods for validation of inputs ● Maximising the maintainability of code ● Exploring the types of errors generated when coding ● Understanding the types of testing that can be performed ● Understanding the types of test data required **Programming Fundamentals** ● Use of subprograms in Python	**Mock Exam (paper 1)** **Time:** 90 mins **Marks:** 80 marks
3	**Boolean Logic** ● What is a logical operator and how does it impact computers ● Comparing the three main logic gates ● The use of truth tables to understand boolean circuits ● Converting logical statements to logic circuits and vice versa **Programming Fundamentals** ● Python challenges	**Boolean Logic assessment** **Time:** 45 mins **Marks:** 40 marks
4	**Languages & IDEs** ● What is a high level programming language ● What is a low level programming language ● Comparing high level and low level programming languages ● Understanding the three types of translators ● Comparing interpreters and compilers and exploring when they are used **Programming Fundamentals** ● Python challenges	**Mock Exam (paper 2)** **Time:** 90 mins **Marks:** 80 marks
5	**Paper 1 Revision** ● Revision and exam preparation **Paper 2 Revision** ● Revision and exam preparation	

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iMedia Revision and Support:

There are many ways in which you can support your child in their Creative iMedia course such as:

- Reading the daily papers and or web articles on technology and media topics
- Discussing how online media impacts you and your family
- Please see individual Google classrooms for your class support which includes:
    - R093 & R094 knowledge organisers
    - Revision packs for exam content
    - Revision packs for NEA / coursework content
    - iMedia skills videos
    - NEA / coursework one pagers
- Studyimedia.co.uk revision website:
  https://studyimedia.co.uk/introduction-to-creative-imedia-j834/
- Know it all ninja revision:
  https://www.knowitallninja.com/
- OCR Creative iMedia (J834)
  https://www.ocr.org.uk/qualifications/cambridge-nationals/creative-imedia-level-1-2-j834/

Computing Revision and Support:

There are many ways in which you can support your child in the study of Computer Science such as:

- Reading the daily papers and or web articles on technology and computer science topics
- Please see individual Google classrooms for your class support including:
    - Theory revision packs
    - Programming challenges
- Watch the weekly BBC technology show - Click
  https://www.bbc.co.uk/programmes/b006m9ry
- CSNewbs revision website:
  https://www.csnewbs.com/
- Seneca revision:
  https://senecalearning.com/en-GB/
- OCR GCSE Computer Science
  https://ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/

Final Level 1 / 2 Award in iMedia Assessment Structure:

Component	Guided Learning Hours	Content	Proposed Examination Date
Unit 1 R093 **40% final grade**	48	**Creative iMedia in the media industry** One final written exam paper, with a combination of MCQ, short and longer answer responses. 1 hour 30 minutes	Summer of Year 11
Unit 2 RO94 **25% final grade**	30	**Visual identity and digital graphics NEA** Students work on a project creating visual identity and digital graphics to a brief provided by the exam board. Students have 30 hours to complete their project.	Summer of Year 10
Unit 3 RO97 **35% final grade**	42	**Interactive digital media NEA** Students work on a project creating an Interactive Digital Media product to a brief provided by the exam board. Students have 42 hours to complete their project.	Summer of Year 11

Please see exam board websites for up to date information:

https://www.ocr.org.uk/qualifications/cambridge-nationals/creative-imedia-level-1-2-j834/

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Final GCSE Computer Science Assessment Structure:

Component	Weighting (%)	Content	Proposed Examination Date
Paper 1	50%	**Computer systems** Introduces students to the central processing unit (CPU), computer memory and storage, data representation, wired and wireless networks, network topologies, system security and system software. It also looks at ethical, legal, cultural and environmental concerns associated with computer science. 1 hour and 30 mins	Summer in Year 11
Paper 2	50%	**Computational thinking, algorithms and programming** Students apply knowledge and understanding gained in paper 1. They develop skills and understanding in computational thinking: algorithms, programming techniques, producing robust programs, computational logic and translators. 1 hour and 30 mins	Summer in Year 11

Please see exam board websites for up to date information:

https://ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/