

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
2.1 Computational thinking, algorithms and programming	2.2 Programming techniques	2.3 Producing robust programs	2.4 Computational logic	2.5 Translators and facilities of languages	2.6 Data representation
<ul style="list-style-type: none"> Algorithms * Programming techniques Producing robust programs Computational logic Translators and facilities of languages Data representation 	<ul style="list-style-type: none"> the use of variables, constants, operators, inputs, outputs and assignments the use of the three basic programming constructs used to control the flow of a program: sequence, selection and iteration (count and condition controlled loops) the use of basic string manipulation the use of basic file handling operations: the use of records to store data the use of SQL to search for data the use of arrays (or equivalent) when solving 	<ul style="list-style-type: none"> defensive design considerations: input sanitisation/validation planning for contingencies anticipating misuse authentication maintainability: comments; indentation the purpose of testing types of testing: iterative; final/terminal; how to identify syntax and logic errors selecting and using suitable test data. 	<ul style="list-style-type: none"> why data is represented in computer systems in binary form simple logic diagrams using the operations AND, OR and NOT truth tables combining Boolean operators using AND, OR and NOT to two levels applying logical operators in appropriate truth tables to solve problems applying computing-related mathematics: +; -; /; * Exponentiation (^) MOD DIV 	<ul style="list-style-type: none"> characteristics and purpose of different levels of programming language, including low level languages the purpose of translators the characteristics of an assembler, a compiler and an interpreter common tools and facilities available in an integrated development environment (IDE): editors, error diagnostics; run-time environment; translators. 	<p>Units</p> <ul style="list-style-type: none"> bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte how data needs to be converted into a binary format to be processed by a computer. <p>Numbers</p> <ul style="list-style-type: none"> how to convert positive denary whole numbers (0–255) into 8 bit binary numbers and vice versa how to add two 8 bit binary integers and explain overflow errors which may occur binary shifts how to convert positive denary whole numbers (0–255) into 2 digit hexadecimal numbers

<p>Assessment: Exam board assessment material</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. Copyright Laws: DPA Computer Misuse Act. Respect. Explain the effects on society of gaming.</i></p>	<p>problems, including both one and two dimensional arrays</p> <ul style="list-style-type: none"> • how to use sub programs (functions and procedures) to produce structured code • the use of data types: • the common arithmetic operators • the common Boolean operators. <p>Assessment: Exam board assessment material</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. Copyright Laws: DPA Computer Misuse Act. Respect. Explain the effects on society of gaming.</i></p>	<p>Assessment: Exam board assessment material</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. Copyright Laws: DPA Computer Misuse Act. Respect. Explain the effects on society of gaming.</i></p>	<p>Assessment: Exam board assessment material</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. applying computing-related mathematics</i></p>	<p>Assessment: Exam board assessment material</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. applying computing-related mathematics</i></p>	<p>and vice versa</p> <ul style="list-style-type: none"> • how to convert from binary to hexadecimal equivalents and vice versa • check digits. <p>Characters</p> <ul style="list-style-type: none"> • the use of binary codes to represent characters • the term ‘character-set’ • the relationship between the number of bits per character in a character set and the number of characters which can be represented (for example ASCII, extended ASCII and Unicode). <p>Images</p> <ul style="list-style-type: none"> • how an image is represented as a series of pixels represented in binary • metadata included in the file • the effect of colour depth and resolution on the size of an image file. <p>Sound</p> <ul style="list-style-type: none"> • how sound can be sampled and stored in digital form • how sampling intervals
---	--	---	--	--	--

					and other factors affect the size of a sound file and the quality of its playback: Compression <ul style="list-style-type: none">• need for compression• types of compression:
--	--	--	--	--	---

Enrichment/Extra Curriculum:

- *We run additional workshops to develop skills during the Computer Club and link to a number of businesses including the O2 and CISCO Challenge.*



**Computer Science at Cox Green 2017-2018
Curriculum Plan**

**Key Stage 4
Year 11**

• Term 1	• Term 2	• Term 3	• Term 4	• Term 5	• Term 6
<p>Content of Computational thinking, algorithms and programming Coursework Unit.</p> <p>Learners will need to create suitable algorithms which will provide a solution to the problems identified in the task. They will then code their solutions in a suitable programming language. The solutions must be tested at each stage to ensure they solve the stated problem and learners must use a suitable test plan with appropriate test data.</p> <p>The code must be suitably annotated to describe the process. Test results should be annotated to show how these relate to the code, the test plan and the original problem.</p> <p>Learners will need to provide an evaluation of their solution based on the test evidence.</p> <p>Learners should be encouraged to be innovative and creative in how they approach solving the tasks.</p> <p>3.1 Programming techniques</p> <ul style="list-style-type: none"> • how to identify and use variables, operators, inputs, outputs and assignments • how to understand and use the three basic programming constructs used to control the flow of a program: Sequence; Selection; Iteration • how to understand and use suitable loops including count and condition controlled loops 	<p>2.5 Translators and facilities of languages</p> <ul style="list-style-type: none"> • characteristics and purpose of different levels of programming language, including low level languages • the purpose of translators • the characteristics of an assembler, a compiler and an interpreter • common tools and facilities available in an integrated development environment (IDE): <ul style="list-style-type: none"> <input type="radio"/> editors <input type="radio"/> error diagnostics <input type="radio"/> run-time environment <input type="radio"/> translators. <p>Assessment: Exam board assessment material</p>	<p>2.6 Data representation Units</p> <ul style="list-style-type: none"> • bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte • how data needs to be converted into a binary format to be processed by a computer. <p>Numbers</p> <ul style="list-style-type: none"> • how to convert positive denary whole numbers (0–255) into 8 bit binary numbers and vice versa • how to add two 8 bit binary integers and explain overflow errors which may occur • binary shifts • how to convert positive denary whole numbers (0–255) into 2 digit hexadecimal numbers and vice versa • how to convert from 	<p>GCSE Revision topics</p> <p>Computer systems</p> <ol style="list-style-type: none"> 1. Systems Architecture 2. Memory 3. Storage 4. Wired and wireless networks 5. Network topologies, protocols and layers 6. System security 7. System software 8. Ethical, legal, cultural and environmental concerns <p>Computational thinking, algorithms and programming</p> <ol style="list-style-type: none"> 1. Algorithms 2. Programming techniques 3. Producing robust programs 4. Computational logic 	<p>GCSE Exam Revision</p>	

<ul style="list-style-type: none"> • how to use different types of data, including Boolean, string, integer and real, appropriately in solutions to problems • how to understand and use basic string manipulation • how to understand and use basic file handling operations: • how to define and use arrays (or equivalent) as appropriate when solving problems • how to understand and use functions/sub programs to create structured code. <p>3.2 Analysis</p> <ul style="list-style-type: none"> • how to analyse and identify the requirements for a solution to the problem • how to set clear objectives that show an awareness of the need for real world utility • how to use abstraction and decomposition to design the solution to a problem • how to identify the data requirements for their system • how to identify test procedures to be used during and after development to check their system against the success criteria • how to use validation to ensure a robust solution to a problem. <p>3.3 Design</p> <ul style="list-style-type: none"> • how to design suitable algorithms to represent the solution to a problem • how to design suitable input and output formats and navigation methods for their system • how to identify suitable variables and structures with appropriate validation for their system • how to use appropriate data types in their system 	<p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. Copyright Laws: DPA Computer Misuse Act. Respect. Explain the effects on society of gaming.</i></p>	<p>binary to hexadecimal equivalents and vice versa</p> <ul style="list-style-type: none"> • check digits. <p>Characters</p> <ul style="list-style-type: none"> • the use of binary codes to represent characters • the term ‘character-set’ • the relationship between the number of bits per character in a character set and the number of characters which can be represented (for example ASCII, extended ASCII and Unicode). <p>Images</p> <ul style="list-style-type: none"> • how an image is represented as a series of pixels represented in binary • metadata included in the file • the effect of colour depth and resolution on the size of an image file. <p>Sound</p> <ul style="list-style-type: none"> • how sound can be sampled and stored in digital form • how sampling intervals and other factors affect the size of a sound file 	<p>5. Translators and facilities of languages</p> <p>6. Data representation</p> <p>Assessment: Exam board assessment material Past Papers Help exams</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. Copyright Laws: DPA Computer Misuse Act. Respect. Explain the effects on society of gaming.</i></p>	
---	---	--	--	--

<ul style="list-style-type: none"> • how to use functions/sub programmes to produce structured reusable code • how to select suitable techniques for the development of the solution. <p>3.4 Development</p> <ul style="list-style-type: none"> • how to develop a solution to the identified problem using a suitable programming language(s) • how to demonstrate testing and refinement of the code during development • how to explain the solution using suitable annotation and evidence of development • how to use suitable techniques to solve all aspects of the problem • how to take a systematic approach to problem solving • how to deploy practical techniques in an efficient and logical manner • how to show an understanding of the relevant information by presenting evidence of the development of their solutions • how to show an understanding of the technical terminology/concepts that arise from their investigation through analysis of the data collected • how to use the terminology/concepts surrounding their topic and contained in the information collected correctly when it comes to producing analysis in the supporting script. <p>3.5 Testing and evaluation and conclusions</p> <ul style="list-style-type: none"> • how to produce a full report covering all aspects of the investigation • how to present the information in a clear form 		<p>and the quality of its playback: sample size; bit rate; sampling frequency.</p> <p>Compression</p> <ul style="list-style-type: none"> • need for compression • types of compression: lossy; lossless. <p>Assessment: Exam board assessment material</p> <p>Skills: Numeracy, Programming. Sequencing, Problem solving</p> <p><i>SMSC/ British Values: Effects of ICT on society. Investigating moral values and ethical issues. Copyright Laws: DPA Computer Misuse Act. Respect. Explain the effects on society of gaming.</i></p>		
--	--	---	--	--

<p>which is understandable by a third party and which is easily navigatable</p> <ul style="list-style-type: none"> • how to critically appraise the evidence that they have presented • how to test their own solution • how to present their evaluation in a relevant, clear, organised, structured and coherent format • how to use specialist terms correctly and appropriately • how to present a conclusion to the report • how to justify their conclusions based on the evidence provided <p>Skills:</p> <ul style="list-style-type: none"> • Numeracy, Programming. • Sequencing, Problem solving • Thinking abstractly – removing unnecessary detail • Thinking ahead – identifying preconditions and inputs and outputs • Thinking procedurally – identifying components of problems and solutions • Thinking logically – predicting and analysing problems • Thinking concurrently – spotting and using similarities. 				
<p>Enrichment/Extra Curriculum:</p> <ul style="list-style-type: none"> • <i>We run additional workshops to develop skills during the Computer Club and link to a number of businesses including the O2 and CISCO Challenge.</i> 				