

Computing Scheme of Work Year 9 2018/2019

Computational Thinking

Programming

Data Representation

Safety and Responsibility





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Introduction:

The following scheme is created to enable class teachers to plan, prepare and assess pupil work according to an overall learning journey. The needs of the learner are paramount and differentiation of this scheme is expected. No doubt there will be further opportunities for students to be taught topics that will further enrich the current scheme. Therefore, it is expected that staff should collaborate and share best practise wherever possible so as to provide more learning opportunities for pupils to make progress in Computing at Alt Bridge. Staff are expected to use a range of assessment strategies and incorporate Assessment for Learning within their teaching style. Further guidance on marking and feedback can be found in the department marking and feedback policy. In addition, where appropriate staff should make pupils aware of links to literacy and numeracy. CLC sessions are available to book for in-class digital workshops. There is also a bank of 10 I Pads available in the main Computing Room.





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The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

In Key stage 3

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 two 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, re-use, revise and re-purpose 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.

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Computing programmes of study: Key stages 3 and 4, National curriculum in England, DFE-00191-2013

[https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239067/SECONDARY_national_curriculum_-_Computing.pdf]



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Overview of the Year:

Module	Topic
1	Computer Systems
2	Binary Logic
3	Representation of Data
4	Programming: Python/Scratch
5	Python/Scratch: Next Steps
6	Programming Project

✓ Indicates that an appropriate homework could be set from this lesson.

Where suitable, CLC sessions are available to book for in-class digital workshops.

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Module	Theme	Calendar Events	Week	Topic	Learning Outcomes	Homework	
1	Computer Systems (Links to OCR Computing GCSE)		1	Issue books – labels and expectations Logging on Setting up emails on mobile devices Define a computer system	To define a computer system To list examples of systems	1	
			2	Computer systems in the modern world	<ul style="list-style-type: none"> To describe the importance of computer systems in the modern world 		
			3	Reliability & Standards	To be able to explain the need for reliability in computer systems <ul style="list-style-type: none"> To be able to explain the standards in computer systems 		
			4	Ethical & Legal Considerations	<ul style="list-style-type: none"> To be able to explain the importance of ethical and legal considerations when creating computer systems 		
			5	Environmental Considerations	<ul style="list-style-type: none"> To be able to explain the importance of environmental considerations when creating computer systems 		
			6	Assessment – formal topic test			
			7	Fix-it-Five	To respond to feedback on assessment		
			8	Input and Output Devices	<ul style="list-style-type: none"> To be able to describe input and output devices for a wide range of computer controlled situations 		
	Half Term						
2	Binary Logic (Links to OCR Computing GCSE)		1	Computer systems in binary form	To be able to explain why data is represented in computer systems in binary form		
			2	Logic Diagrams	To understand and produce simple logic diagrams using the operations NOT, AND and OR	✓	
			3	Truth Tables	To produce a truth table from a given logic diagram		
			4	Truth Tables	To produce a truth table from a given logic diagram	✓	
			5	Assessment – formal topic test			
			6	Fix-it-Five	To respond to feedback on assessment	✓	
			7	Seasonal lesson			
	Christmas Break						



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Module	Theme	Calendar Events	Week	Topic	Learning Outcomes	Homework
3	Representation of Data		1	Data in Computer Systems	To define the terms bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte To understand that data needs to be converted into a binary format to be processed by a computer.	✓
			2	Data in Computer Systems	To be able to convert positive denary whole numbers (0-255) into 8-bit binary numbers and vice versa To be able to add two 8-bit binary integers and explain overflow errors which may occur	
			3	Data in Computer Systems	To be able to convert positive denary whole numbers (0-255) into 2-digit hexadecimal numbers and vice versa To be able to convert between binary and hexadecimal equivalents of the same number	✓
			4	Assessment – formal topic test		
			5	Fix-it-Five	To respond to feedback on assessment	✓
			6	Data in Computer Systems	To be able to explain the use of hexadecimal numbers to represent binary numbers	
Half Term						
4	Programming – Introduction to Python http://www.teach-ict.com/2016/ks3/ks3_home.html		1	Introduction to Python	•	
			2	Numbers and Arithmetic	•	✓
			3	Selection	•	
			4	Writing algorithms	•	✓
			5	Assessment – Test a program	•	
	Easter Break					
	Programming –		1	Fix-it-Five	To respond to feedback on assessment	✓

Awaiting Department Feedback



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Module	Theme	Calendar Events	Week	Topic	Learning Outcomes	Homework
5	Python Next Steps http://www.teach-ict.com/2016/ks3/ks3_home.html		2	While loops	•	
			3	Searching	•	✓
			4	Lists	•	
			5	Procedures	•	✓
			6	Functions		
Half Term						
6	Programming Project – Gamemaker Project https://www.pgonline.co.uk/resources/ks3/ Kodu (minecraft type game) Or Website Development Wordpress. HTML Web design.		1	Game analysis Sprites and objects	•	✓
			2	Enemies and collision detection	•	✓
			3	Firing projectiles	•	
			4	Capturing the flag	•	✓
			5	Testing and assessment		
			6	Fix-it-Five	To respond to teacher feedback	

Awaiting Department
Feedback