Longcroft School Curriculum Overview
COMPUTING

Longcroft School Mission Statement

Longcroft strives to be a positive, warm and welcoming school where pupils aim to do their very best and, with great heart, thought and vision, take pride in their achievements and those of our community. By constantly challenging our pupils to excel, we nurture aspiration and strive to cultivate a lifelong love of learning in our young people. We provide a creative, safe, inclusive and caring environment where every child is known and cared for as an individual. In this climate, every young person has the opportunity to thrive as they develop in personality, character and intellect and become a highly successful learner and individual.

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COMPUTING

Introduction

This document outlines the curriculum and key considerations including:

- Aims and purpose
- Alignment with the whole school provision and curriculum intent
- A summary programme of study which includes sequencing of taught content

We use the National Curriculum as our statutory foundation and broadly share its principles and aims including:

- 'To provide pupils with an introduction to the essential knowledge that they need to be educated citizens. To introduce pupils to the best that has been thought and said; and help engender an appreciation of human creativity and achievement'.
- To prepare students to be confident in themselves, to have a fulfilled and successful life beyond our school – one where they contribute positively to society.
- Our statutory curriculum is just one element in the education of every child. There is time and space in the school day and in each week, term and year to range beyond statutory specifications.
- Provision of a framework of core knowledge around which teachers can develop exciting and stimulating lessons to promote the development of pupils' knowledge, understanding and skills as part of the wider school curriculum.
- The wider school curriculum includes an extensive range of opportunities and activities that are routinely available to students, are inclusive and reflect our diverse community.

Inclusion

In accordance with our school curriculum statement, teachers will set high expectations for every pupil. They should plan stretching work for all pupils, including whose attainment is significantly above the expected standard. There is an even greater obligation to plan lessons for pupils who have low levels of prior attainment or come from disadvantaged backgrounds. Evidence based approaches must be taken to respond to specific needs including students with special educational needs and those for whom English is not their first language; and be regularly reviewed. Teacher's must at all times take account of their duties under equal opportunities legislation and act consistently with our vision and values.

Numeracy and literacy

Teachers should take opportunities to develop pupils' mathematical fluency, spoken language, reading, writing and vocabulary within their specific discipline and in line with the expectations laid out in our school curriculum statement.

Purpose of study

'A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.' Adapted from National Curriculum, DfE, 2014.

Aims

The Longcroft School and Sixth Form 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.

Subject Curriculum Vision

Our vision for Computer Science is to offer opportunities and support for our learners to be challenged in their understanding and knowledge of a rapidly changing needs of the computer industry. Computing should have very high profile in the life of the school and needs to be at the cutting edge of initiatives to raise pupil progress. Access to computing equipment is good; the computing infrastructure is working towards enabling pupils and staff to have very good access to their work and to the school's learning resources at all times, and so contributes to pupils' academic success.

Our curriculum reflects our core school values of Great Heart, Great Thought and Great Vision:

Great Heart

We encourage students to help each other socially, academically and emotionally to ensure that if a student need to share resources or peer asses and help another student with for example their coding that ethos is within the classroom helps this to happen fairly. We have respect and tolerance with our computer suite to encourage all to strive towards a love of learning and the subject.

Great Thought

We expect all students to be prepared to challenge themselves and sometimes we encourage a '**trial and error**' approach to teaching coding and computation thinking in a bid to make classrooms more relevant to the real world. We equip students to with skills and competences in coding languages to take this forward to further study and academic success. We communicate high expectations, enthusiasm and passion about computing to pupils; we challenge and inspire pupils to produce the best work they can. We have a high level of specialist knowledge and facilitate active learning in computing, which ensures pupils' achievement.

Great Vision

We encourage students to enjoy computing as a subject through both a well-managed curriculum to give a taste of many aspects of the topic but to also support their love of the topic through after school clubs and opportunities to learn through experience. We use a range of innovative and imaginative resources and teaching strategies to stimulate pupils' active participation in their learning.

Longcroft School Curriculum Overview
COMPUTING

Key subject skills

AO1	AO2	AO3
Demonstrate knowledge and understanding of the key concepts and principles of computer science.	Apply knowledge and understanding of key concepts and principles of computer science.	Analyse problems in computational terms: • to make reasoned judgements • to design, program, evaluate and refine solutions.

Building on prior learning - *What can students do by the end of KS2?*

By the end of KS2, pupils should have been taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information
- use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

What are the skills gaps?

Most students entering KS3 still enter with more ICT skills than genuine Computer Science skills. Most students in Yr 7 anticipate that Computer Science will be about the use of computers and not software development/Networking/Hardware/etc.

- Generally, pupils from all feeder primary schools are familiar with creating presentations using Microsoft PowerPoint.
- Typically keyboard skills increasingly becoming a weakness due to use of iPads as a primary resource in primary schools – this leads to some pupils lacking a facility with keyboards.
- Although the primary curriculum covers coding, this is not always taught consistently so some pupils do not have an awareness or knowledge of basic coding concepts and skills.

Baseline expectations

- An aptitude for logical reasoning and a willingness to engage in the logical reasoning that underpins computational thinking gives a good indication of those pupils who are likely to be successful in Computer Science

Longcroft School Curriculum Overview
COMPUTING

Year 7

Students can:

• 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

• understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems

Year 8

Students can:

• design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems

• understand the meaning of aglorthms and how they are applied to solve everyday problems

• use a block programming language to gain a fundamental understanding of the key programming concepts of sequencing, iteration and selection

Year 9

Students can:

• use 2 programming languages (scratch and python), 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 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

Year 10

Students can:

• 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

• 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

• understand what algorithms are, what they are used for and how they work in relation to creating programs

Year 11

Students can:

• understanding of what algorithms are, what they are used for and how they work; ability to follow, amend and write algorithms; ability to construct truth tables.

• understand binary, data representation, data storage and compression.

• understand the hardware and software components of computer systems and characteristics of programming languages.

• understand computer networks and network security.

• have an awareness of emerging trends in computing technologies, and the impact of computing on individuals, society and the environment, including ethical, legal and ownership issues.

• understand what algorithms are, what they are used for and how they work in relation to creating programs

Longcroft School Curriculum Overview
COMPUTING

	Autumn				Spring				Summer			
Year	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links
7	Computers • Introduction • E-Safety • Input/Output devices • Internal components of a computer • Storage devices	This is a 12-lesson block taught in rotation. End of unit assessment will be a short online examination completing in formal conditions.	AO1 AO2 AO3	Links to prior learning KS2 - Using technology safely Select, use, and combine a variety of software How does this prepare students for future learning? Key concepts prepare pupils for the theory elements of GCSE.	Computers • Introduction • Input/Output devices • Internal components of a computer • Storage devices	This is a 12-lesson block taught in rotation. End of unit assessment will be a short online examination completing in formal conditions.	AO1 AO2 AO3	Links to prior learning KS2 - Using technology safely Select, use, and combine a variety of software How does this prepare students for future learning? Key concepts prepare pupils for the theory elements of GCSE.	Computers • Introduction • Input/Output devices • Internal components of a computer • Storage devices	This is a 12-lesson block taught in rotation. End of unit assessment will be a short online examination completing in formal conditions.	AO1 AO2 AO3	Links to prior learning KS2 - Using technology safely Select, use, and combine a variety of software How does this prepare students for future learning? Key concepts prepare pupils for theory elements of GCSE.
8	Computational thinking • Introduction to programming • Algorithms • Decomposition • Abstraction	This is a 9-lesson block taught in rotation. End of unit assessment will be a short online	AO1 AO2 AO3	Links to prior learning KS2 - Logical reasoning and simple algorithms	Computational thinking • Introduction to programming • Algorithms • Decomposition • Abstraction	This is a 9-lesson block taught in rotation. End of unit assessment will be a short online	AO1 AO2 AO3	Links to prior learning KS2 - Logical reasoning and simple algorithms	Computational thinking • Introduction to programming • Algorithms • Decomposition • Abstraction	This is a 9 lesson block taught in rotation. End of unit assessment will be a short online	AO1 AO2 AO3	Links to prior learning KS2 - Logical reasoning and simple algorithms

	• Scratch programming - 6 lessons	examination completing in formal conditions.		How does this prepare students for future learning? Key concepts prepare pupils for using textual programming in year 9 and GCSE	• Scratch programming - 6 lessons	examination completing in formal conditions.		How does this prepare students for future learning? Key concepts prepare pupils for using textual programming in year 9 and GCSE	• Scratch programming - 6 lessons	examination completing in formal conditions.		How does this prepare students for future learning? Key concepts prepare pupils for using textual programming in year 9 and GCSE
9	Computational thinking • Searching and sorting algorithms • Python programming - 6 lessons	This is a 9-lesson block taught in rotation. End of unit assessment will be a short online examination completing in formal conditions.	AO1 AO2 AO3	Links to prior learning KS2 - Design, write and debug programs that accomplish specific goals How does this prepare students for future learning? Key concepts prepare pupils for using textual programming in GCSE	Computational thinking • Searching and sorting algorithms • Python programming - 6 lessons	This is a 9-lesson block taught in rotation. End of unit assessment will be a short online examination completing in formal conditions.	AO1 AO2 AO3	Links to prior learning KS2 - Design, write and debug programs that accomplish specific goals How does this prepare students for future learning? Key concepts prepare pupils for using textual programming in GCSE	Computational thinking • Searching and sorting algorithms • Python programming - 6 lessons	This is a 9-lesson block taught in rotation. End of unit assessment will be a short online examination completing in formal conditions.	AO1 AO2 AO3	Links to prior learning KS2 - Design, write and debug programs that accomplish specific goals How does this prepare students for future learning? Key concepts prepare pupils for using textual programming in GCSE
10	Problem solving with programming.	End of topic online assessment	AO1 AO2 AO3	Links to prior learning	Problem solving with programming.	End of topic online assessment	AO1 AO2 AO3	Links to prior learning	Problem solving with programming.	End of topic online assessment	AO1 AO2 AO3	Links to prior learning

Longcroft School Curriculum Overview

COMPUTING

	One lesson per week is dedicated to key programming concepts throughout the two-year course. Data – understanding of binary, data representation, data storage and compression.	completed under formal exam conditions. End of topic written assessment completed under formal exam conditions.		How does this prepare students for future learning? Key concepts prepare pupils for Paper 1 and Paper 2 of the GCSE	One lesson per week is dedicated to key programming concepts throughout the two-year course. Computational thinking – understanding of what algorithms are, what they are used for and how they work; ability to follow, amend and write algorithms; ability to construct truth tables.	completed under formal exam conditions. End of topic written assessment completed under formal exam conditions.		How does this prepare students for future learning? Key concepts prepare pupils for Paper 1 and Paper 2 of the GCSE	One lesson per week is dedicated to key programming concepts throughout the two-year course. Computers – understanding of hardware and software components of computer systems and characteristics of programming languages. Networks – understanding of computer networks and network security.	completed under formal exam conditions. End of topic written assessment completed under formal exam conditions.		How does this prepare students for future learning? Key concepts prepare pupils for Paper 1 and Paper 2 of the GCSE
11	Problem solving with programming. One lesson per week is dedicated to key programming concepts throughout the two-year course. Issues and impact – awareness of emerging trends in computing technologies, and the impact of computing on individuals, society and the environment, including ethical, legal and ownership issues.	End of topic online assessment completed under formal exam conditions. End of topic written assessment completed under formal exam conditions.	AO1 AO2 AO3	Links to prior learning How does this prepare students for future learning? Key concepts prepare pupils for Paper 1 and Paper 2 of the GCSE	Problem solving with programming. An increased focus throughout the term, with application to practical problems. ● understanding what algorithms are, what they are used for and how they work in relation to creating programs ● understanding how to decompose and analyse problems ● ability to read, write, refine, and evaluate programs.	End of topic online assessment completed under formal exam conditions.	AO1 AO2 AO3	Links to prior learning How does this prepare students for future learning? Key concepts prepare pupils for Paper 1 and Paper 2 of the GCSE	Revision and exam preparation across all topics covered over the two-year course.	Paper 1: Principles of Computer Science Written examination: 1 hour and 30 minutes 50% of the qualification 75 marks Paper 2: Application of Computational Thinking Onscreen examination: 2 hours 50% of the qualification 75 marks	AO1 AO2 AO3	Links to prior learning How does this prepare students for future learning? Key concepts prepare pupils for Paper 1 and Paper 2 of the GCSE

Longcroft School Curriculum Overview
COMPUTING

Enrichment Opportunities

Key stage	
KS3	Coding club after school on a Wednesday after school 3.10pm to 4.10pm
KS4	After school homework and revision support, Tuesday 3.10pm to 4.10pm. Visit to Bletchley Park.
KS5	