Kingfisher Curriculum Offer - Computing

Curriculum Offer
(SLT)

Progression Map and National Curriculum Aims and Expectations
(Curriculum Lead)

Progression Map and Proposed Timescale with Core Curriculum Aims, Qualification Mapping and Teaching Schedule
(Subject Lead)

Lesson plans and Resources including Displays and Assessment
(Classroom Teacher)

Progression Map

Level Expected at the end of:

- Key Stage 2
- Key Stage 3
- Key Stage 4
- Post 16

Key Stage 2 Kingfisher School Curriculum Offer	Key Stage 2 Content National Curriculum Expectations
Autumn Term: **LKS2** Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies. Recognise common uses of information technology beyond school **UKS2** 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 Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts **Spring Term** **LKS2** Use logical reasoning to predict the behaviour of simple programs Use technology purposefully to create, organise, store, manipulate and retrieve digital content **UKS2**	**Pupils should be 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

Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content Use sequence, selection, and repetition in programs; work with variables and various forms of input and output **Summer Term** **LKS2** Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions Create and debug simple programs **UKS2** 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 logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	
Key Stage 3 Kingfisher School Curriculum Offer	**Key Stage 3 Content National Curriculum Expectations**
A computing scheme has been designed for Kingfisher School • The aim for computing is to develop young people who are digital literate, resilient and have problem solving skills. Students will develop transferable skills to use across the curriculum in school and into the wider world. • The curriculum is designed in line with ASDAN computing and the Cambridge Nationals Curriculum. This allows progression throughout all year groups. **Autumn 1:** Infrastructure of Computers, we will look at how computers are made and how we can keep safe from viruses. They will learn how to evaluate their own and other work throughout. Demonstrate basic Microsoft office skills in word and presentation.	**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

Autumn 2: Digital media and Content – In this term we will look at various websites, what makes a good and bad website along with various digital media contents. Students will create their own websites using various design tools learnt **Spring 1:** Web Development – Although we have already covered the web development aspect in the previous terms work this time we will look monetizing websites, along with exploring why some websites might load slower/faster than others and various coding aspects to websites. **Spring 2:** Programming – in this term we will look at several types of programming. Using Scratch and Python Programming we will discover these 2 languages of programming in detail and explore which one is more advantageous depending on a set scenario. **Summer 1:** Health and Safety in Computing – through this term we will look at the impacts to people spending to long on technology. We will cover posture, eye strain, and look at the main causes within the computer sector. To confirm this, we will revisit Autumn 1s work on building computer and teach a primary class how to build a PC safely. **Summer 2:** Career in Computing/ 3D Printing – In this unit we will look at various careers within computing. Computer has been known to be well paid, in demand and this is showing students the pathways into these careers. We will also practice interviewing and looking at the requirements to get into Computing. To finish the school year students will finish off with a tutorial and have a go at designing and making their own 3D prints.	• 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
Key Stage 4 Kingfisher School Curriculum Offer	**Key Stage 4 Content National Curriculum Expectations**
Students to be given the opportunity to learn Computer Science as the core of computing is computer science. Students to be 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, students are equipped to use information technology to create programs, systems and a range of content. Kingfisher will be following Pearsons Computer Science GCSE scheme.	All pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career. All pupils should be taught to:

Over the course of 2 academic years students will be taught the 6 following topics:

1.Computational thinkings

- benefits of using decomposition, abstraction and subprograms
- working with algorithms, expressed as flowcharts, written descriptions and in program code
- determining the correct output of an algorithm for a given set of data
- using a trace table to perform a dry-run of an algorithm
- types of errors found in algorithms and programs
- correcting logical errors in algorithms
- how standard sorting and searching algorithms work
- evaluating the fitness for purpose of an algorithm
- constructing truth tables

2.Data

- why computers use binary
- converting between unsigned and signed denary and 8-bit binary numbers
- adding and shifting binary numbers, overflow
- converting between hexadecimal and binary, ehy hexadecimal is used
- binary representation of text, images and sound
- using binary multiples, and constructing expressions to calculate file sizes and data capacity requirements
- the need for and different methods of data compression

3.Computers

- the stored program concept, and the role of memory, the CPU and buses in the fetch-decode-execute cycle
- the role of secondary storage, and how data is stored on different types of media
- the purpose of an operating system and utility software
- robust software, and methods of identifying software vulnerabilities
- low-level and high-level programming languages how interpreters and compilers translate high-level code

4. Networks

- reasons for connecting computers in a network, and types of network
- how the internet is structured
- characteristics of wired and wireless connectivity
- constructing expressions involving file size, time, and transmission rate measured in bits per second
- network protocols and the TCP/IP stack
- common network topologies

- develop their capability, creativity and knowledge in computer science, digital media and information technology
- develop and apply their analytic, problem-solving, design, and computational thinking skills
- understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns

• network security, and ways of identifying vulnerabilities and protecting networks 5. Issues and impact • environmental issues associated with the use of digital devices • ethical and legal issues associated with the collection and use of personal data • ethical and legal issues associated with the use of AI, machine learning and robotics • methods of intellectual property protection for computer systems and software • threats to digital systems and data posed by malware and hackers and methods or protection 6.Problem solving with programming • using decomposition and abstraction to understand and solve problems • identifying the structural components of programs • converting algorithms into code designing, writing and debugging programs • using techniques to make programs easy to read and maintain • working with variables and constants, primitive data types, and one-and two-dimensional data structures • manipulating and formatting strings • implementing validation and authentication • responding to user input • reading from and writing to text files • using pre-existing and user-defined subprograms • understanding the difference between and using global and local variables	

Intent - Computing

At Kingfisher, our computing curriculum is designed to provide all students with equal opportunities to work with a range of age-appropriate technology and become confident when using them. They will have the opportunity to use a range of applications and programmes, to prepare them for life after school and in the wider world. They will learn about coding, online safety and problem solving, a skill which is extremely important and transferable across the whole curriculum.

Our students will have the opportunities to use technology across the curriculum and during break times: for example, use of the IT suite across a variety of subjects and IT club at break and lunch times.

Implementation

At the beginning of every new academic year teachers demonstrate to students how to stay safe online, ensuring a safe learning environment and what to do when they get that feeling when things do not feel right online. This is repeated throughout the year and embedded in our IT curriculum across the school to ensure we keep up with the growing world of online gaming and social trends.

Our curriculum builds on the skills and knowledge that students gains as they move up through the school. They will have opportunities to use a variety of technology and qualification routes.

Teachers plan and delivery hight quality lessons that are meaningful, fun and creative to our students. So, students can apply their skills within a context. To offer students a wide range of opportunities to use technology across the curriculum to enable them to be independent learners.

Impact

Our students become confident at exploring and using a variety of technology for various sues in school, at home and in the future.

Students are taught using a range of learning resources which help them to develop a broad range of skills in a variety of software packages (MyOn UK, Renaissance Reading, Education City, Python, Scratch, Pivot, Microsoft Office). Once pupils are confident in using a piece of software, they will then be more confident to create work independently, showcasing their skills and knowledge.

Students will have the opportunity to explore their information communication skills through the use of a variety of resources (laptops, iPads, IT suite, Beebots, mini robot, interactive presentations, online learning experiences and the use of interactive screens.

Students in secondary also have the opportunity to attend IT club and morning break, afternoon break and lunchtime break, where they can explore the world wide web and various online resources. This also supports their social interaction with students across secondary.