Computing Scheme of Work

The national curriculum 2014 states that:

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.

Aims

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.

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.

Progression in Computing involves developing knowledge and skill through 3 key aspects of the computing curriculum:

- **Computer science**: principles of information and computation, how digital systems work and how to put this knowledge to use through programming
- **Information Technology**: used to create programs, systems and a range of content
- **Digitally literacy**: able to use, and express themselves and develop their ideas through, information and communication technology safely

Computing – progression in skills across Key Stage 2

	Emerging	Developing	Competent
Computer Science	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 Use logical reasoning to predict the behaviour of simple programs	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 (*if… then..*) and repetition (*repeat.. until..* loop) in programs; work with variables (keep track of things that can change while a program is running, a bit like *x or y* in algebra) 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
Information Technology	Recognise common uses of information technology beyond school	Select, use and combine a variety of software (including internet services) on a range of digital devices.	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
Digital Literacy	Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies (key principles of E-safety) Use technology purposefully to create, organise, store, manipulate and retrieve digital content	Use technology safely and respectfully, keeping personal information private Use search technologies effectively, *appreciate how results are selected and ranked and be discerning in evaluating content.* Understand the opportunities networks offer for communication and collaboration	Use technology safely, respectfully and responsibly; recognize acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact *(building on key skills of E-safety with emphasis on responsibility)* Understand computer networks including the internet; how they can provide multiple services, such as the World Wide Web and the subjective natures contained within, identify the varied opportunities they offer for communication and collaboration, and the potential dangers aligned to them.

The Scheme of Work for Computing at CKJS aims to match the requirements of the national curriculum and provide an exciting, stimulating curriculum enabling our pupils to develop competence in their computing skills.

Pupils will develop these skills by following the following curriculum across Key Stage 2.

Year Group	E-Safety	Computer Science			Content creation using ICT	Evaluating Digital Content: Figures in Computing focus
		Hardware and physical processes	Software Programming	Network Theory		
3	Why we need E-safety. How to identify and report concerns (Hectors World?). School's AUP.	Identify component parts inside a client machine (eg Hard Drive, RAM, Processor). Recognise these parts have no intelligence of their own and can do nothing unless assembled	Logo	Understand that computers in a school are connected together in a network and why. Understand the difference between the internet and www.	Word processing, creating pictures using paint packages	How to find information online. The difference between a browser and the internet as its common reference. How to use a browser correctly to find text, images, and videos online for a given purpose.

		correctly and a program is executed. All software needs programming. (first year)B Bots to work alongside Logo.				**Focused Figure: Tim Berners-Lee and www.**
4	Identify information which can and which should not be shared eg via E-mail. School's AUP.	Portable devices of digital cameras and video camera. Connecting these to a client machine to transfer or backup data. Mission control simulation of physical processes	Kodu	Understand that servers for the internet are located all over the world. Understand how E-mail is sent and received across the internet. How the internet allows us to communicate	Editing and using digital photographs and video (stop frame animation?)	Search efficiently (URL vs browser) and evaluate the reliability and relevance of a source for a given purpose **Focused Figure: Charles Babbage, Ada Lovelace and origins of computer**
5	Why and how to restrict access to your electrical devices. Knowing who you are talking to. Effective password policies. School's AUP.	Makey Makey	Scratch	TCP and UDP protocols and binary Code. Creating and editing wikis as a means of collaboration on a network.	PowerPoint. Using Excel to create graphs (to import into Wikis)	Search specifically with knowledge of meta tag technology and google terms to return the most useful source. Web spiders' role in search engines. Appreciate how web pages are ranked in a search engine. **Focused Figures: Steve Jobs and Bill Gates as representatives of Apple Mac and PC markets.**
6	How computer viruses, spam and phishing attacks are transmitted. How to identify them and control the risk these present (Cyber-crime and identity-theft theories.) Social networking sites. School's AUP.	Raspberry pi	Advanced Scratch/Python	Understand what HTML is and recognise HTML tags. Use them to remix a web page. Create a webpage using HTML.	Organise and store correctly blog posts and wikis. Movie Maker.	Searching with knowledge of cannot display webpage, 4xx and 5xx returned server errors. Knowing what this means and what action to take. Role of proxy servers, DNS and cached websites. **Focused Figure: Clive Sinclair – development of consumer electronics in 20th century.**