Computing at Banks Lane Junior School

At Banks Lane Junior School, we intend for our pupils to leave us in year 6 with the knowledge, skills and attitudes that they need to effectively navigate the digital world in the 21st century. The curriculum covers the foundations, applications and implications of computing, ensuring that pupils progress in computer science, information technology and digital literacy.

Key Concepts are golden threads that run through our curriculum subjects and support us in revisiting and reviewing previously taught knowledge and content. They support in making connections in learning so that it becomes 'sticky' knowledge. In Computing these concepts are:

KEY CONCEPTS

Problem Solving   Programming   Logical Thinking   Content Creating

E-Safety   Communicating   Searching

Substantive knowledge is the factual content for a subject which must be connected into a careful sequence. Substantive knowledge is understood better with repeated encounters in meaningful contexts.

Disciplinary knowledge is the action taken within a particular subject to gain the substantive knowledge through skills, critical thinking and enquiry.

Progression of Computing skills and disciplinary knowledge.

National Curriculum Outcomes for KS2

The National Curriculum for Computing aims to ensure that all pupils can:

- 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.

Where possible, our concepts are aligned with Banks Lane Infant School to ensure continuous development of knowledge. Our teachers understand the importance of referring back to prior learning in the previous key stage and linking key concepts wherever practical.

Reception - Year 2

Key concepts: Creating Media, Data & Information, Problem Solving, Impact of Technology, Machines, Programming, Safety & Security.

- I can add and remove text on a computer
- I can edit text e.g. font, colour, style
- I can label, compare and group objects.
- I can use my algorithm to create a program
- I can combine four direction commands to make a sequence
- I can describe what different tools do
- I can choose a command for a given purpose
- I understand not to share information online with unknown people
- I can identify technology
- I can identify a computer and its main parts
- I can use a mouse in different ways
- I can use a keyboard to type and edit text
- I can select objects by attribute and make comparisons
- I can explain what happens when we change the order of instructions
- I can use a digital device to take a photograph and use tools to edit and improve.
- I can use logical reasoning to predict the outcome of a program (series of commands)
- I can create and debug a program that I have written
- I can identify IT beyond school
- I can abide by the school e-safety rules and explain why they are important
- I know to tell an adult if something online makes me feel uncomfortable
- I keep personal information private

Year 3

Units of work - We are Programmers, We are Bug Fixers, We are Presenters, We are who we are, We are Co-authors, We are Opinion Pollsters

Key Skills

- I can plan and create an algorithm for an animated scene in the form of a storyboard.
- I can write a program in Scratch to create an animation, including characters, dialogue, costumes, backdrops and sound.
- I can review animation programs and correct mistakes.
- I can develop a number of strategies for finding errors in programs.
- I can recognise a number of common types of bugs in software.
- I can create a narrated presentation.
- I can record a piece to camera.
- I can edit a movie using static images and green screen footage.
- I can create a number of structured presentations.

- I can consider issues of trust and privacy when sharing information.
- I can become familiar with Wikipedia, including potential problems associated with its use.
- I understand some ethical and legal aspects of online data collection.
- I understand the conventions for collaborative online work, particularly in wikis.
- I can use the Internet to facilitate data collection.
- I can gain skills in using charts to analyse data.
- I can develop web-based research skills.

Knowledge Vocabulary

Bug, Creative Commons, Hyperlinks, Output, Sprite

Skills Vocabulary

Repeat, Sequence, Review, Facilitate

Year 4

Units of work - We are Software Developers, We are Makers, We are Musicians, We are Bloggers, We are Artists, We Are Meteorologists

Key Skills

- I can develop an educational computer game using selection and repetition.
- I can start to debug computer programs.
- I can test and debug programs I write, using an on-screen Simulator and the Micro: bit.
- I understand the tools and techniques of a vector graphics package
- I can develop an understanding of turtle graphics.
- I understand and can use variables.
- I can program using the MakeCode block based environment.
- I understand inputs and outputs available on a BBC micro: bit.
- I understand different measurement techniques for weather.

- I can convert and transfer a program written on screen to the Micro: bit.
- I can play music using virtual instruments.
- I can compose or edit virtual tunes.
- I can create a sequence of blog posts on a theme.
- I can use spreadsheets to create charts.
- I can comment on the blog posts of others safely and know what unacceptable behaviour looks like on blogs
- I can use computer-based data logging to automate the recording of some weather data.
- I can incorporate additional media in a blog post by searching the internet.
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Knowledge Vocabulary

Accelerometer, Analogue, Bitmap, Digital, Input, Internet, Variables

Skills Vocabulary

Compose, Convert, Debug, Simulate

Year 5

Units of work - We are Game Developers, We Are Cryptographers, We are Architects, We are Web Developers, We are Adventure Gamers, We are VR Designers

Key Skills

- I can design and create a computer program for a computer game, which uses sequence, selection, repetition and variables.
- I can detect and correct errors in my game.
- I can use iterative development techniques.
- I can use semaphore and Morse code.
- I can use hyperlinks for navigation between the slides of a presentation.
- I can create my own VR scene.
- I can explain what the source code for a web page looks like and how it can be edited.
- I can use a simple CAD tool.
- I can develop spatial awareness by exploring and experimenting with a 3-D virtual environment.

- I can create 360° photosphere images.
- I can understand the need for private information to be encrypted.
- I can encrypt and decrypt messages in simple ciphers.
- I can name and explain the function of components making up the school's network.
- I can explain how information is passed between the components that make up the Internet.
- I can add well-chosen Creative Commons licensed images to a presentation.
- I can explore real-world and imagined locations in VR.

Knowledge Vocabulary

CAD, Cipher, GPS, IP Address, Iterative Development, Packets

Skills Vocabulary

Decrypt, Encrypt, Render, Transmit

Year 6

Units of work - We are Toy Makers, We are Computational Thinkers, We are Publishers, We are Connected, We are Advertisers, We are AI Developers

Key Skills

• I can design and write more complex programs for a Micro: Bit.
• I understand common algorithms for searching and sorting a list.
• I can work with physical components of a Micro: Bit.
• I can train a neural net to classify images.
• I can train a machine learning system to identify sentiments.
• I can explain how search results are selected and ranked.
• I can explain how decision trees can be trained automatically to classify data.
• I can explain how a neural net recognises images.
• I can design and produce a high-quality print document.
• I can work collaboratively to create and edit assembled content to make an effective advert.

• I understand appropriate rules or guidelines for a civil online discussion.
• I understand and can acknowledge intellectual property rights.
• I can consider some ethical principles in designing AI systems.
• I can explain how computers use stored programs to connect input to output.
• I can source digital media while demonstrating safe, respectful and responsible use.

Knowledge Vocabulary

AI, Binary, Final Cut, Linear, Machine Learning, Microprocessor

Skills Vocabulary

Consider, Decompose, Source, Train