Computing at Newtown Community Primary School

Excellence in Learning for Excellence in Life

Intent and implementation: How do we teach Computing and what this looks like in practice at Newtown

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.

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

Curriculum planning	The national curriculum and EYFS is the starting point for the Computing curriculum at Newtown Community Primary School. The Newtown curriculum is a progressively sequenced curriculum that is built around key themes and ideas identified within available curriculum research on computing. At Newtown we believe that the computing curriculum enables children to select, use and combine a variety of computing ideas and concepts to support them in their wider learning. We see computing as a tool for communication and presentation; solving problems; and the evaluation and analysis of information and data from across the curriculum, as much as it is a subject to be taught within its own right. To this end the Newtown curriculum is securely embedded within other curriculum areas. Each unit sequence of computing learning is planned to build coherently across a series of sessions, where children learn the component knowledge, skills and understanding necessary to build towards composite outcomes. Developing safe and respectful use of devices, computers, social media and computing networks is central to the computing curriculum taught at Newtown. We recognise that computing comprises a core set of knowledge, skills and understanding that transcend all stages of a child and young person's education. To maximise this concept and ensure effective progression and transition into the next stages of learning, we endeavour to use devices and programmes that have familiar operational aspects and principles to those children will experience within future educational settings. For example, we teach children how to collaborate and work remotely using Microsoft Teams because we know this will be an expectation at secondary school.
Build on prior learning, embedding most useful content	'Golden Threads'; the most useful content within computing has been identified and the curriculum is structured to enable regular revisiting of this content throughout the curriculum progression and within other subject areas. These 'Golden Threads' in computing are: • **Computer Science:** Programming Computational Thinking and Problem Solving • **Information Technology:** Creating Digital Artefacts • **Information Technology:** Knowledge of Computing Contexts • **Digital Literacy:** Being an effective, safe and discerning user of a different computer systems
Relevant contexts for learning	Contexts for computing learning are identified and planned for so they are purposeful, relevant and engaging for children. For example, the use of Excel spreadsheets to collect, analyse and summarise in science; PowerPoint to present the four stages of the Newtown Learning Process.
Vocabulary and language use	Children learn relevant vocabulary because it is explicitly included within the sequenced curriculum end points, unit learning sequences and through knowledge organisers used to deepen children's disciplinary knowledge.
Assessment	Authentic assessment is used to enable, both children and teachers to understand success. In all year groups a blend of outcome self-assessment criteria and low stakes quizzes are used.

Computing: EYFS	Computing: Most useful content KS1		
How the Early Years Curriculum supports the KS1 and KS2 Computing curriculum,	**Essential knowledge, understanding and skills.**		**This means children will know and understand:**
			Key Stage 1

Computing and the use of technology is not an explicit outcome within EYFS.
However, within EYFS we plan provision that enables children to work towards the explicit computing curriculum they will experience from Year 1 onward.
Specifically focussed on
Development Matters
Personal, Social and Emotional Development
• show resilience and perseverance in the face of challenge
• know and talk about the different factors that support their overall health and wellbeing including:
  ○ sensible amounts of 'screen time'
Physical Development
• develop their small motor skills so that they can use a range of tools competently, safely and confidently
  ○ Manipulate devices and device peripherals e.g. mouse
Expressive Art and Design
• explore, use and refine a variety of artistic effects to express their ideas and feelings
Personal, Social and Emotional Development
Managing Self ELG
• Be confident to try new activities and show independence, resilience and perseverance in the face of challenge;
• Explain the reasons for rules, know right from wrong and try to behave accordingly;
Expressive Arts and Design
Creating with Materials ELG
• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form, and function;
 	
Computer Science: coding using simple instructions.
Information Technology: take a good photo and paint with an app.
Digital Literacy: Know who to speak to in order to keep safe when using the internet.
	Computer Science
	Programming Computational Thinking and Problem Solving
		• 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
			• command
			• algorithm
			• input
			• output
			
			Context
			Lego coding express
			Bee Bot programmable devices

	Information Technology
	Creating Digital Artefacts
		• Use technology purposefully to create, organise, store, manipulate and retrieve digital content	• Locate, open and save a document
			• Know where the letters are located on a keyboard
			• Use the shift key to get key symbols
			• Use Caps lock to turn on and off capital letters
			• Use the space bar
			• Use the return/ enter key to move to a new line
			• Use a mouse and know how to right click to paste
			• Hold down the left mouse button to highlight text
			• Know where basic punctuation is located on a keyboard
			• Know how to use the text alignment function to centre text
			• Insert pictures by copying and pasting:
			  ○ Using mouse
			  ○ Using the paste button top left toolbar
			
			Context
			• Wordpad
			• Teacher recording learning across 4 Stages of learning slides

	Information Technology Knowledge of Computing Contexts	• Recognise common uses of information technology beyond school • Understand computer networks including the internet	• Search • Copy and paste an image from the internet • Information technology **Context** • Research for other curriculum areas • Internet use always modelled by the class teacher • Investigating information technology beyond school
	Digital Literacy Being an effective, safe and discerning user of a different computer systems	• 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.	• Self-Image and Identity • Online Relationships • Online Reputation • Online Bullying • Managing Online Information • Health, Well-being and Lifestyle • Privacy and Security • Copyright and Ownership **Context** Project Evolve Newtown's Me, You and Everything Else Curriculum

KS2 Computer Science: Programming Computational Thinking and Problem Solving			
Essential knowledge, understanding and skills by the end of Key Stage 2		**This means children will know and understand:**	
		Lower Key Stage 2	**Upper Key Stage 2**
Computer Science Programming Computational Thinking and Problem Solving	How to: Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems Work with variables and various forms of input and output Solve problems by decomposing them into smaller parts Use sequence, selection, and repetition in programs Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	Programming Command Output Input Loop Function Conditions	Command Output Input Loop Function Conditions Algorithm Variables Events Text based coding debugging decomposing
		Context Lego WeDo Getting Started and Mars Rover Unit	**Context** Microsoft MakeCode and BBC Microbit Use established code Combine and alter code Write own code

KS2 Information Technology: Creating Digital Artefacts

<table>
<tr><th colspan="2" rowspan="2">Essential knowledge, understanding and skills by the end of Key Stage 2</th><th colspan="2">This means children will know and understand:</th></tr>
<tr><th>Lower Key Stage 2</th><th>Upper Key Stage 2</th></tr>
<tr><td rowspan="5">Information Technology
Creating Digital Artefacts</td><td rowspan="5">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</td><td>• Design and create multi-slide multimedia presentations
• Basic formatting functions
• Organise pages and content using basic graphic design principles:
Layout
Font
Font size
Colour of font
Background colour
Insert images, video and sound files</td><td>• Design multi-slide multimedia presentations
• Organise pages and content using more complex graphic design principles:
Alignment
Hierarchy
Contrast
Repetition
Proximity
Balance
Colour theory
Negative space</td></tr>
<tr><td>Context and Expectation
Microsoft PowerPoint
4 Stages of learning slides 3 examples each year</td><td>Context and Expectation
Microsoft PowerPoint
4 Stages of learning slides 3 examples each year</td></tr>
<tr><td>• Design and create documents that include text and graphics.
• Basic formatting functions
• Organise pages and content using basic graphic design principles:
Layout
Font
Font size
Colour of font
Background colour
Insert images, video and sound files</td><td>• Design and create documents that include text and graphics.
• Organise pages and content using more complex graphic design principles:
Alignment
Hierarchy
Contrast
Repetition
Proximity
Balance
Colour theory
Negative space</td></tr>
<tr><td>Context
Microsoft Word
3 examples each year</td><td>Context
Microsoft Word
3 examples each year</td></tr>
<tr><td colspan="2"></td><td>Use the features of GarageBand to:
• Design and create musical compositions that further secure children's understanding of musical ideas (music progression)
• Design and create sound recording for a range of purposes including podcasts.
• Embed their own musical compositions within other multimedia content. E.g. PowerPoint</td></tr>
<tr><td colspan="2"></td><td>Context
Apple GarageBand
1 example each year</td></tr>
</table>

KS2 Information Technology: Creating Digital Artefacts			
Essential knowledge, understanding and skills by the end of Key Stage 2		**This means children will know and understand:**	
		Lower Key Stage 2	**Upper Key Stage 2**
Information Technology Creating Digital Artefacts		• Create and organise simple spreadsheets for money and measurements • Total simple ranges of data • Create a range of graphs • = for formulas • Formulas SUM, MIN, MAX, COUNT formula • Carry out calculations using =*/+- • Sort a range of data • Filter a range of data • Use Forms and Excel to gather, evaluate and analyse data and information	• Create and organise spreadsheets for money and measurements including unit cost, quantity and calculation and subtotal and total. • Formulas AVERAGE, COUNTIF, IF, CELING, FLOOR, CONCAT • Combine */+- and formulas to solve problems • Use Forms and Excel to gather, evaluate and analyse data and information
		Context Microsoft Excel and Forms 6 examples each year	**Context** Microsoft Excel and Forms 6 examples each year

KS2 Information Technology: Knowledge of Computing Contexts			
Essential knowledge, understanding and skills by the end of Key Stage 2		**This means children will know and understand:**	
		Lower Key Stage 2	**Upper Key Stage 2**
Information Technology Knowledge of Computing Contexts	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	How to safely, effectively and efficiently search the internet Compose and send emails Join and participate appropriately in TEAMS meetings Identify, access and use appropriate apps for a task	How to safely, effectively and efficiently search the internet Compose and send emails Collaborate online effectively and respectfully in a range of ways including document and presentation creation. Confidently present a range of documents and presentations via TEAMS meetings
		Context MS Teams and Outlook	**Context** MS Teams and Outlook

Digital Literacy: Knowledge of Computing Contexts			
Essential knowledge, understanding and skills.		**This means children will know and understand:**	
		Lower Key Stage 2	**Upper Key Stage 2**
Digital Literacy Being an effective, safe and discerning user of a different computer systems	Use technology safely, respectfully and responsibly; Recognise acceptable/unacceptable behaviour Identify a range of ways to report concerns about content and contact.	Self-Image and Identity Online Relationships Online Reputation Online Bullying Managing Online Information Health, Well-being and Lifestyle Privacy and Security Copyright and Ownership	Self-Image and Identity Online Relationships Online Reputation Online Bullying Managing Online Information Health, Well-being and Lifestyle Privacy and Security Copyright and Ownership
		Context Project Evolve Newtown's Me, You and Everything Else Curriculum	**Context** Project Evolve Newtown's Me, You and Everything Else Curriculum