Great Wilbraham C of E Primary Academy

GWPS Computing Curriculum

Curriculum Statement

It is essential that children develop digital literacy in order to access the modern world as the technology that surrounds us is developing at an ever-increasing pace. To equip our children for this, we must develop their critical thinking skills and encourage an exposure to a range of technology so that they may adapt to new technologies as they arise.

The Computing Curriculum aims to ensure that all pupils can understand and apply the most important principles and concepts of computer science, including abstraction, logic, algorithms and data representation. At Great Wilbraham, we use the excellent teach computing.org resources to provide high quality teaching and learning and ensure progression and coverage of the computing curriculum across the school.

IMPLEMENTATION

Coherence and flexibility
The Teach Computing Curriculum is structured in units. For these units to be coherent, the lessons within a unit must be taught in order. However, across a year group, the units themselves do not need to be taught in order, except for 'Programming' units, where concepts and skills rely on prior learning and experiences.

Knowledge organisation
The Teach Computing Curriculum uses the National Centre for Computing Education's computing taxonomy to ensure comprehensive coverage of the subject. This has been developed through a thorough review of the KS1–4 computing programme of study, and the GCSE and A level computer science specifications across all awarding bodies. All learning outcomes can be described through a high-level taxonomy of ten strands, ordered alphabetically as follows:

- **Algorithms** — Be able to comprehend, design, create, and evaluate algorithms
- **Computer networks** — Understand how networks can be used to retrieve and share information, and how they come with associated risks
- **Computer systems** — Understand what a computer is, and how its constituent parts function together as a whole

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- **Creating media** — Select and create a range of media including text, images, sounds, and video
- **Data and information** — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
- **Design and development** — Understand the activities involved in planning, creating, and evaluating computing artefacts
- **Effective use of tools** — Use software tools to support computing work
- **Impact of technology** — Understand how individuals, systems, and society interact with computer systems
- **Programming** — Create software to allow computers to solve problems
- **Safety and security** — Understand risks when using technology, and how to protect individuals and systems

The taxonomy provides categories and an organised view of content to encapsulate the discipline of computing. Whilst all strands are present at all phases, they are not always taught explicitly.

Spiral curriculum

The units for key stages 1 and 2 are based on a spiral curriculum. This means that each of the themes is revisited regularly (at least once in each year group), and pupils revisit each theme through a new unit that consolidates and builds on prior learning within that theme. This style of curriculum design reduces the amount of knowledge lost through forgetting, as topics are revisited yearly. It also ensures that connections are made even if different teachers are teaching the units within a theme in consecutive years. The units have been planned carefully so that a two year rolling programme is still possible.

Online safety

The unit overviews for each unit show the links between the content of the lessons and the national curriculum and Education for a Connected World framework (ncce.io/ efacw). These references have been provided to show where aspects relating to online safety, or digital citizenship, are covered within the Teach Computing Curriculum. Not all the objectives in the Education for a Connected World framework are covered in the Teach Computing Curriculum, as some are better suited to personal, social, health, and economic (PSHE) education; spiritual, moral, social, and cultural (SMSC) development; and citizenship. However, the coverage required for the computing national curriculum is provided.
In addition to the embedded online safety, we as a school teach the online safety units from the Cambridgeshire PSHE scheme.

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Physical computing
The Teach Computing Curriculum acknowledges that physical computing plays an important role in modern pedagogical approaches in computing, both as a tool to engage pupils and as a strategy to develop pupils' understanding in more creative ways. Additionally, physical computing supports and engages a diverse range of pupils in tangible and challenging tasks.

The physical computing units in the Teach Computing Curriculum are:
- Year 5 – Selection in physical computing, which uses a Crumble controller (but could also use micro:bits)
- Year 6 – Sensing movement, which uses a micro:bit

We link this to the units in D&T where physical computing can be used, usually with micro:bits.

IMPACT

Formative assessment
Every lesson includes formative assessment opportunities for teachers to use. These opportunities are listed in the lesson plan and are included to ensure that misconceptions are recognised and addressed if they occur. They vary from teacher observation or questioning, to marked activities.
These assessments are vital to ensure that teachers are adapting their teaching to suit the needs of the pupils that they are working with, and you are encouraged to change parts of the lesson, such as how much time you spend on a specific activity, in response to these assessments.
The learning objective and success criteria are introduced in the slides at the beginning of every lesson. At the end of every lesson, pupils are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down. This gives pupils a reminder of the content that has been covered, as well as a chance to reflect. It is also a chance for teachers to see how confident the class is feeling so that they can make changes to subsequent lessons accordingly. Formative judgements can also be made through observations, marking and recorded through updates to objectives on Insight.

Summative assessment
Every unit includes an optional summative assessment framework in the form of either a multiple choice quiz (MCQ) or a rubric. All units are designed to cover both skills and concepts from across the computing national curriculum. Units that focus more on conceptual development include an MCQ. Units that focus more on skills development end with a project and include a rubric. However, within the 'Programming' units, the assessment framework (MCQ or rubric) has

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been selected on a best-fit basis. Summative assessments are usually made at the end of a unit through a triangulation of observations, evidence in books and assessment tasks stated in the medium term plans and annual summative judgements are made using Insight.

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What makes a GW Computing Expert?

Someone who is aware of the diversity of computing experts

Someone who confidently uses a range of technology

Someone who is able to keep safe online

Someone who can use technology creatively for different purposes

Someone who is enthusiastic using different technology

Someone who thinks critically and can debug code

'With God, all things are possible' (Matthew 19:26)

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Progression of skills document

	Progression of skills			
Curriculum objectives	Pupils should be taught to: • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • 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.	Pupils should be taught to: • 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 • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • 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.	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.	
Computing systems and networks	• Recognising technology in school and using it responsibly.	• Recognising technology in school and using it responsibly. • Identifying IT and how its responsible use improves our world in school and beyond.	• Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks. • Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.	• Recognising IT systems in the world and how some can enable searching on the internet • Exploring how data is transferred by working collaboratively online
Creating media	• Choosing appropriate tools in a program to create art. • Capturing digital photographs for different purposes.	• Choosing appropriate tools in a program to create art and making comparisons with working non-digitally. • Using a computer to create and format text, before comparing to writing non-digitally.	• Capturing and editing digital still images to produce a stop-frame animation that tells a story. • Capturing and editing audio to produce a podcast, ensuring that copyright is considered.	• Planning, capturing and editing video to produce a short film • Designing and creating webpages, giving consideration to copyright, aesthetics and navigation

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		• Capturing and changing digital photographs for different purposes. • Using a computer as a tool to explore rhythms and melodies, before creating a musical composition.	• Creating documents by modifying text, images, and page layouts for a specified purpose. • Manipulating digital images and reflecting on the impact of changes and whether the required purpose is fulfilled.	• Creating images in a drawing program by using layers and groups of objects • Planning, developing and evaluating £D computer models of physical objects
Data and information	• Sort and group objects by properties.	• Exploring object labels, then using them to sort and group objects by properties. • Collecting data in tally charts and using attributes to organise and present data on a computer.	• Building and using branching databases to group objects using yes/no questions. • Recognising how and why data is collected over time, before using data loggers to carry out an investigation.	• Using a database to order data and create charts to answer questions • Answering questions by using spreadsheets to organise and calculate data
Programming	• Writing short algorithms and programs for floor robots	• Writing short algorithms and programs for floor robots and predicting program outcomes. • Designing and programming the movement of a character on screen to tell stories. • Creating and debugging programs and using logical reasoning to make predictions. • Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz.	• Creating sequences in a block-based programming language to make music. • Using a text-based programming language to explore count-controlled loops when drawing shapes. • Writing algorithms and programs that use a range of events to trigger sequences of actions. • Using a block-based programming language to explore count-controlled and infinite loops when creating a game.	• Exploring conditions and selection using a programmable microcontroller • Exploring variables when designing and coding a game • Exploring selection in programming to design and code an interactive quiz • Designing and coding a project that captures inputs from a physical device.
Key Vocabulary	Computer, information, object, program, run, technology	Algorithm, attribute, code, command, computer, data, debug, information, object, program, property (attribute), run, technology	Attribute (property), browser, computer network, computer system, data set, debugging, digital device, execute, hardware, hyperlink, information, input, network, object, output, output device, process, program, repetition, router, selection, server, software, switch (network switch), variable, web, web address, web browser, web page, website, WiFi, WAP (Wireless Access Point), WWW (World Wide Web)	Code snippet, condition, condition-controlled loop, count controlled loop, decompose, domain name, execute (run), HTML (HyperText Markup Language), infinite loop, input device, internet, loop, loop (condition-controlled), loop (count controlled), loop (infinite), procedure, run (execute), stored (data), subroutine, URL (uniform Resource Locator),

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Long Term Plan and Curriculum Coverage

The below tables demonstrate the long term plan and how the objectives in the progression map relate to the individual units. The units are placed in a carefully designed order that either build upon each other within a yearly cycle or independent of each other.

The Early Years framework does not specifically mention computing as a subject, but it comes within the Understanding of the World. The objectives within the progression map above are interwoven within the overview plan.

Fieldmice R/1	Autumn Term		Spring Term		Summer Term	
Computing Cycle A	Technology around us	Digital Painting	Moving a robot	Grouping data	Creating media	Programming animations
Computing Cycle B	Technology around us	Digital Painting	Moving a robot	Grouping data	Creating media	Programming animations
Squirrels 2/3	**Autumn Term**		**Spring Term**		**Summer Term**	
Computing Cycle A	Y3 Computing systems: Connecting computers	Y3 Creating media: Animation	Y3 Programming A: Sequence in music	Y3 programming B: Events and actions	Y3 Data and info: Branching databases	Y3 Creating media: Desktop publishing
Computing Cycle B	Y2 Computing systems and networks - IT around us	Y2 Creating media - digital photography	Y2 Creating media - making music	Y2 Data and info - pictograms	Y2 Programming A - robot algorithms	Y2 Programming B - intro to quizzes
Hedgehogs 4/5	**Autumn Term**		**Spring Term**		**Summer Term**	

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Computing Cycle A	Y5 Computing systems: Sharing info	Y5 Creating media: Vector drawing	Y5 Creating media: Video editing	Y5 Programming B: Quizzes (scratch3)	Y5 Data and info: Databases	Y5 Programming A: physical computing (crumble)
Computing Cycle B	Y4 Computing systems: The internet	Y4 Creating media: Photo editing Christmas cards	Y4 Programming A: Repetition in shape	Y4 Data and info: Data logging	Y4 Creating Media: Audio editing	Y4 programming B: Repetition in games
Badgers 6	**Autumn Term**		**Spring Term**		**Summer Term**	
Computing Cycle A/B	Y6 Computing systems: Communication	Y6 Data and info: Spreadsheets	Y6 Creating media: 3D modelling space station	Y6 Creating media: Web page creation	Y6 Programming B: Sensing (micro:bit)	Y6 Programming A: Variables in games