Computing Policy

Quinton Primary School

Approved by:	Headmaster: D Skelcher	Date: September 2020
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1) Curriculum Statement

Intent

In line with the 2014 National Curriculum for Computing, our aim is to provide a high-quality computing education which equips children to use computational thinking and creativity to understand and change the world. The curriculum teaches children key knowledge about how computers and computer systems work, and how they are designed and programmed. Learners have the opportunity to gain an understanding of computational systems of all kinds, whether or not they include computers.

By the time they leave Quinton Primary School, children will have gained key knowledge and skills in the three main areas of the computing curriculum: computer science (programming and understanding how digital systems work), information technology (using computer systems to store, retrieve and send information) and digital literacy (evaluating digital content and using technology safely and respectfully). The objectives within each strand support the development of learning across the key stages, ensuring a solid grounding for future learning and beyond.

Implementation

At Quinton Primary School, computing is taught using a blocked curriculum approach. This ensures children are able to develop depth in their knowledge and skills over the duration of each of their computing topics. Teachers use the 'Switched On: Computing' scheme, published by Rising Stars, as a starting point for the planning of their computing lessons, which are often richly linked to engaging contexts in other subjects and topics. We have laptops and iPads to ensure that all year groups have the opportunity to use a range of devices and programs for many purposes across the wider curriculum, as well as in discrete computing lessons. Employing cross-curricular links motivates pupils and supports them to make connections and remember the steps they have been taught.

The implementation of the curriculum also ensures a balanced coverage of computer science, information technology and digital literacy. The children have experiences of all three strands in each year group, but the subject knowledge imparted becomes increasingly specific and in depth, with more complex skills being taught, thus ensuring that learning is built upon. For example, children in Key Stage 1 learn what algorithms are, which leads them to the design stage of programming in Key Stage 2, where they design, write and debug programs, explaining the thinking behind their algorithms.

Impact

Our approach to the curriculum results in a fun, engaging, and high-quality computing education. The quality of children's learning is evident: from pictures of coding in topic books, displays in classrooms, animations on the website and enthusiasm of pupils. Evidence such as this is used to feed into teachers' future planning, and as a topic-based approach continues to be developed, teachers are able to revisit misconceptions and knowledge gaps in computing when teaching other curriculum areas. This supports varied paces of learning and ensures all pupils make good progress.

Much of the subject-specific knowledge developed in our computing lessons equip pupils with experiences which will benefit them in secondary school, further education and future workplaces. From research methods, use of presentation and creative tools and critical thinking, computing at Quinton Primary School gives children the building blocks that enable them to pursue a wide range of interests and vocations in the next stage of their lives.

2) Teaching and Learning

Even though whole school co-ordination and support is essential to the development of Computing capability, it remains the responsibility of each teacher to deliver appropriate Computing activities and assist the co-ordinator in the monitoring and recording of pupil progress in Computing. Teachers' own use of Computing in lessons is also an essential part of preparing engaging, fast moving, motivating lessons for pupils. The Computing co-ordinator suggests which Computing units best suit which topics in each year group – appropriate apps and software is also advised.
In addition, the Computing co-ordinator keeps teachers up to date on the latest uses of Computing as a teaching tool; individual teachers then need to implement these tools into their lessons wherever possible.

Teachers are expected to follow the outline or Rising Stars units, however they are encouraged to further adapt them to topics as well as to the needs of the class. As long as the computing programme of study is being met, then class teachers can plan schemes of lessons as they wish.

3) Assessment

Formative Assessment

Self-assessment

In line with the National Curriculum, children are taught to debug their own programs, use logical reasoning to explain simple algorithms (including their own), and detect and correct errors in both algorithms and programs.

Peer-assessment

The ideas of self-assessment suggested above translate naturally into peer assessment, with pupils working with a partner to review, and help correct, algorithms and programs, or provide critical, constructive feedback on digital content.

Open questioning

Pupils' knowledge of the concepts covered by the programme of study may not be immediately apparent in the work they produce. The use of open questioning is one way in which you can both assess and develop their grasp of concepts.

Discussion with peers

Encouraging pupils to use similar open questions can be effective in allowing them to focus on what they've learned, rather than only on what they've done. Moving some of this discussion online, and perhaps involving pupils in other schools or countries, would be one powerful way to illustrate the opportunities offered by computer networks for communication and collaboration.

Target setting

Project management skills such as planning, organising, motivating others and allocating resources, are of great importance in real-world projects, and they can be widely applied in education.

Reviewing as a class

Children's computing work should be stored in the Pupil area of the school's network. Any work completed directly in a computing lesson should be saved to the class folder on the network. Whole classes can then review completed work and assess.

Summative Assessment

At the end of each unit, Switched On Computing provides a series of "I can" statements. For example, at the end of the We are Programmers (Unit 3.1) in Year 3:

I can create a storyboard for an animation. ☹ 😐 ☺

I can include action and dialogue in my storyboard. ☹ 😐 ☺

I can write a computer program for an animation. ☹ 😐 ☺

I can put Scratch blocks in the right order. ☹ 😐 ☺

I can correct mistakes in my program. ☹ 😐 ☺

I can create sound and graphics for my animation. ☹ 😐 ☺

I can explain how my storyboard and program are linked. ☹ 😐 ☺

I can use a *repeat* block in my program. ☹ 😐 ☺

I can find and correct 'bugs' in my program. ☹ 😐 ☺

I can upload my animation to the Scratch website. ☹ 😐 ☺

I can get ideas from the Scratch website. ☹ 😐 ☺

This interactive activity can be used by children to become aware of their targets to work on. In addition, using this form as a check list, teachers can check the progress of their pupils as they move through the different units across the school.

4) Planning and Resources

Planning: Rising Stars: Switched On Computing

The school uses the Rising Stars: Switched On Computing scheme as a starting point to deliver the programme of study. It covers the programme of study for computing, including programming and computational thinking. This scheme supports clear progression of skills from Years 1 to 6, with early years using separate resources from the Switched On ICT scheme, which will prepare them for the work that will be covered in the following years. The Computing scheme supports teachers of all levels of experience as it provides software demos and detailed step by step planning. Throughout the scheme, E-Safety is embedded to ensure the safe and responsible use of technology. Quinton Primary School has installed a range of new and free software to deliver this programme of study. The programmes are relevant and easy to use. All of the medium-term plans and lesson plans can be accessed via the shared drive.

Resources

Laptop trolleys
There is a class set of laptops, each having access to a range of programmes that can meet the needs of the new programme of study. These allow computing work in the classroom environment.

iPads
There are a number of iPads for use within the classroom to support the programme of study.

Classroom computers
There is at least one laptop in each classroom. These machines are networked and have access to the shared drive for planning and preparation.

Printers and photocopier
The colour photocopier and printer is networked to every computer.

Interactive whiteboards
Each classroom has an interactive board linked to the desktop computer.

Other resources to support the curriculum

- Beebots
- Digital Cameras
- Headphones
- Digital Microscopes

5) Organisation

Computing is taught in topic blocks by the class teacher, to have a project-based approach. There are 6 topics that can be covered at any point throughout the year. These can be found in the Computing Provision map:

YEAR		Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
3	TOPIC	Stone Age	Egypt	Transport	Extremes	Europe	France
	ICT THEME	COMMUNICATION/ COLLABORATION We are communicators	COMPUTER NETWORKS We are vloggers	PRODUCTIVITY We are opinion pollsters	CREATIVITY We are presenters.	PROGRAMMING We are programmers	COMPUTATIONAL THINKING We are bug fixers
	PROJECT	(Email) Write a series of emails to the Natural History Museum to say that you found something when visiting Skara Brae.	(PowerPoint) Make and share a screencast about a trip to visit the pyramids in Egypt.	(Excel) Carry out a survey of local transport. Then, produce bar graphs of results using Excel.	(iPads) Produce / film a dramatic news item about desertification	(Scratch / Snap!) Animation of pizza being made.	(Scratch / Snap!) Print code of simple animations that work – can they work out what they do? Spot an error and fix in similar code?
	TOPIC	Africa	London's	Pioneers	Scented	Wonder	Beachcomb

6) EYFS

EYFS are given an introduction to computing at an early stage. Resources from Switched on Computing are used in addition to a range of other resources. For example, pupils are given the opportunity to explore code.org units of work for pre-readers found on the iPads.

	PROJECT	PowerPoint) Research and present pictures of Toys from Internet.	Use programmable toys.	/ Tux Paint) Illustrate an e book.	2paint a picture) Create a card electronically.	Film the steps of recipe – a meal for a Super Hero.	Produce a talking book .
EYFS	TECHNOLOGY						
	22 – 36 Months	Seeks to acquire basic skills in turning on and operating some ICT equipment					
		Operates mechanical toys					
	30 – 50 months	Knows how to operate simple equipment (eg turns on CD player)					
		Shows an interest in technology toys with knobs and pulleys, or real objects					
		Shows skill in making toys work by pressing parts to achieve sounds or movements					
		Knows that information can be retrieved from computers					
	40 – 60 months	Complete a simple program on a computer					
		Uses ICT hardware to interact with age-appropriate computer software					

7) KS1 and KS2

At Quinton Primary School, children in both key stages are taught about the benefits of the knowledge and skills they are learning, as well as their application in real life contexts and professions. (see Whole School Provision Map).

Key Stage 1 - Subject Knowledge

a) Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions

An algorithm is a precisely defined procedure – a sequence of instructions, or a set of rules, for performing a specific task (e.g. instructions for changing a wheel or making a sandwich). While all correct algorithms should produce the right answer, some algorithms are more efficient than others. Computer scientists are interested in finding better algorithms, partly out of intellectual curiosity, and partly because improvements in algorithms can result in massive savings in terms of both cost and time. An algorithm is a precisely defined procedure – a sequence of instructions, or a set of rules, for performing a specific task (e.g. instructions for changing a wheel or making a sandwich). While all correct algorithms should produce the right answer, some algorithms are more

efficient than others. Computer scientists are interested in finding better algorithms, partly out of intellectual curiosity, and partly because improvements in algorithms can result in massive savings in terms of both cost and time.

b) Use logical reasoning to predict the behaviour of simple programs

Computers are deterministic machines. We can predict exactly how they'll behave through repeated experience or by developing an internal model of how a piece of software works. Stepping through the program can give a clear sense of what it does, and how it does it, giving a feel for the algorithm that's been implemented. In the classroom, getting one pupil to role-play a floor turtle or screen sprite while another steps through the program can give a far more immediate sense of what's going on. When working with a computer, encourage pupils to make a prediction about what the program will do before they press return or click the button, and to explain their prediction logically; this is part of computer science. Logical reasoning also implies that pupils are following a set of rules when making predictions. Pupils who step outside the boundaries of these rules are not using logical reasoning. A pupil who expects a roamer to jump doesn't understand the constraints of its programming language or hardware

c) Use technology purposefully to create, organise, store, manipulate and retrieve digital content

Creating digital content has many practical possibilities. These include commonplace tasks such as word-processing, creating pictures using paint packages, working with digital photographs and video (including animations), writing computer programs, and creating online content such as blog posts, forum contributions, wiki entries and social network updates. This creative work is digitised (i.e. converted to numbers) once it's on the computer.

The sheer quantity of digital information makes the skill of organising digital content more important than ever. In more practical terms, we might think of how to bring together different digital media, how to order a series of paragraphs, how to organise the files in our documents directory, or how to tag photos and posts online.

Storing digital content is perhaps something we take for granted. Knowing where a file is saved in the directory structure is important. It's vital to be able to distinguish between the hard disk (or solid-state storage) inside the computer itself, the school's network server, USB disks or memory cards, and online storage via the internet. Manipulating digital content is likely to involve using one or more application programs, such as word-processors, presentation software, or image-, audio- or video-editing packages.

The pupil makes changes to the digital content, which might include combining content from multiple sources. The skill here is not just using the software tools, but also knowing how best to change the content for the audience and purpose, and to take into account principles of good design. Retrieving digital content could be seen as the reverse of storing: the skills of opening and saving documents are similar. Retrieving content requires you to know what you called the file, what file type it is, and where you stored it.

d) Recognise common uses of information technology beyond school.

There are many opportunities for pupils to consider the applications of algorithms, programs and systems.

e) 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

This statement covers the key principles of pupils' e-safety. Pupils should be aware of the main risks associated with the internet, and recognise that they should not share certain types of personal information online. Pupils must have a clear understanding of what to do if they have concerns about inappropriate online behaviour (such as unwelcome contact or cyberbullying). Telling a teacher or parent should normally be the first response, but pupils should also know that they can talk directly and confidentially to Childline about such matters. As well as the emphasis on this aspect in lessons, the school also celebrates the annual national 'Safer Internet Day'. This includes an assembly about e-safety and communications to parents in line with national guidance on safer internet use at home. (See e-Safety Policy)

Key Stage 2 – Subject Knowledge

a) Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them in to smaller parts

The focus on algorithms at key stage 1 leads pupils into the design stage of programming at key stage 2. Algorithms are the necessary start of the process of creating working code, and identifying the steps needed to solve any problem is essential. Splitting problems into smaller parts is part of computational thinking. For example, designing a game in Scratch will involve thinking about algorithms, programming, drawing sprites and backgrounds, making animations, and even composing music or recording sound effects.

b) Use sequence, selection, and repetition in programs; work with variables and various forms of input and output

Sequence in this context is the step-by-step nature of computer programs, mirroring the sequence of steps the algorithm would list.

Selection refers to instructions such as if ... then ... otherwise decisions in which the operation (what the program does) depends on whether or not certain conditions are met. For example, a quiz provides different feedback if the player answers the question correctly or incorrectly. It is helpful to refer pupils to selections (choices) they make in everyday life; for example, if it rains in the morning, then I will wear my anorak to school, otherwise I won't.

Repetition is a programming structure such as a repeat ... until loop in which the computer runs part of the program a certain number of times or until a particular condition is met. Variables are used to keep track of the things that can change while a program is running. They are a bit like x or y in algebra, in that the values may not initially be known.

c) Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and program

Key stage 2 pupils should be able to explain the thinking behind their algorithms, talking through the steps and explaining why they've solved a problem the way they have. They also need to be able to look at a simple programming project and explain what's going on. This is made easier with languages like Scratch and Logo, which feature an on-screen sprite or turtle. The immediate

feedback helps pupils to understand and debug their programs. Pupils might also be expected to look at someone else's algorithm and explain how it does what it does.

d) 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

Computer networks, including the internet, are made up of computers connected together. The computers include fast, dedicated machines that pass on data that's not intended for them (called 'routers', 'gateways', 'hubs' or 'switches', depending on particular roles), and 'servers' (always-on machines looking after emails, web pages and files that other computers might ask for from time to time). The connections between the computers in a network may consist of radio or satellite signals, copper wires or fibre-optic cable.

e) Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content

Using search technologies involves aspects of computer science, information technology and digital literacy. Effective use of search engines gets the results you want. It relies on specifying the right keyword, skimming and scanning the results to see which seems most relevant, and distinguishing between the main results and adverts presented as sponsored results. It may also involve using other features of the search engine, including searching for phrases rather than keywords, or limiting searches to a particular time frame, language, reading level or website.

f) 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

This is something of a catch-all requirement, bringing together various aspects of the computing curriculum. Pupils might typically be expected to demonstrate progression by:
• using software under the control of the teacher
• then, using software with increasing independence
• then, combining software (e.g. importing an edited image or video into a presentation or web page)
• then, selecting software themselves (perhaps from the full range of applications installed on computers, smartphones and tablets at home or at school, or available to them via the web)

g) Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact

Safe and responsible use of technology at key stage 2 builds on skills learned in key stage 1. As well as requiring pupils to keep themselves safe and to treat others with respect, the programme of study at key stage 2 introduces an emphasis on responsible use of technology. Pupils need to consider how their online actions impact other people. They need to be aware of their legal and ethical responsibilities, such as showing respect for intellectual property rights (e.g. musical, literary and artistic works), keeping passwords and personal data secure, and observing the terms and conditions for web services they use (such as the 13+ age restriction on most websites, including Facebook).

Pupils should also develop some awareness of their digital footprint: the data automatically generated when they use the internet and other communication services, and how this is, or could be, used. Pupils should be aware of, and abide by, the school's acceptable use policy, as well as the

requirements of any other services they use. Encourage pupils to think twice, and to check terms and conditions, before signing up for internet-based services.

As well as the emphasis on this aspect in lessons, the school also celebrates the annual national 'Safer Internet Day'. This includes an assembly about e-safety and communications to parents in line with national guidance on safer internet use at home.

8) Equal Opportunities

All children have equal opportunities to reach their full potential across the English curriculum, regardless of their race, gender, cultural background, and ability, or of any physical or sensory disability.

9) Inclusion

Children with Special Educational Needs (SEND)

At Quinton Primary School, all children have the right to access the computing curriculum. In order to ensure that children with special educational needs achieve to the best of their ability, it may be necessary to adapt the delivery of the computing curriculum for some pupils. We teach computing to all children, whatever their ability.

Computing forms part of the national curriculum to provide a broad and balanced education for all children. Through the teaching of computing we provide learning opportunities that enable all pupils to make progress. We do this by setting suitable learning challenges and responding to each child's different needs. Where appropriate, computing can be used to support SEN children on a one-to-one basis where children receive additional support. Additionally, as part of our approach to teaching and learning, we will use adapted resources wherever possible such as visual timetables, different coloured backgrounds and screen printouts.

Children with English as an additional language (EAL)

All teachers include a range of strategies to support children with EAL which include: teacher and peer modelling and consistent use of visual support, repetition and recasting of language features, word banks and scaffolded speaking and listening activities.

Teachers work with the Inclusion Manager to best meet the needs of individuals within their classes.

10) Role of the Subject Leader

The role of the subject leader in Computing is to coordinate the teaching of computing across all phases of the school. This is in order to secure high quality provision for every child, including outstanding literacy teaching and learning, effective use of resources and the highest standards of achievement for all.

Some key duties that the computing subject leader should undertake over the course of the year include:

- Monitoring of books
- Monitoring of the pupils' work saved to the network
- Learning walks and lesson observations
- Planning and organising computing enrichment opportunities
- Helping identify and facilitate the professional development needs of staff
- Liaising with SLT to help implement school improvement priorities

- Liaising with the LEA's support team
- Organising, maintaining and cataloguing resources
- Keeping abreast of new initiatives and software in teaching computing

11) <u>Parents</u>

We recognise how crucial the home/ school link is for supporting children to have the highest standards of achievement in all subjects, including Computing. Parental involvement is highly encouraged, especially if there is a specialist subject being taught within a class. At parents' evenings, questions can be answered and support can be provided. Information of Internet Safety is regularly sent home to parents.