Together we grow; Together we achieve

Computing Guidance

September 2020

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1. Curriculum Statement - Computing

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 will teach children key knowledge about how computers and computer systems work, and how they are designed and programmed. Learners will have the opportunity to gain an understanding of computational systems of all kinds, whether or not they include computers.

By the time they leave Pippins, 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 Pippins 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 plan from a variety to sources to provide an ambitious curriculum which are richly linked to engaging contexts in other subjects and topics where possible. We have a computing suite and some ipads and laptops to ensure that all year groups have the opportunity to use a range of devices and programs for many purposes across the wider curriculum. 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 will 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 will be evident on our website, where pupils can share and evaluate their own work, as well as that of their peers. Evidence such as this is used to feed into teachers' future planning and 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 Pippins 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 and prepare them for lifelong learning in the 21st Century.

2. Teaching and Learning

Lessons are planned based upon the Pippins long term plan, using Teach Computing resources and in accordance with the National Curriculum to ensure that pupils make progress through each year group, acquiring and applying key knowledge, so that they at least meet the agreed age expectations.

Teachers' own confidence of using technology is also an essential part of preparing engaging, fast moving, motivating lessons for pupils. The computing leader will keep teachers up to date on the latest initiatives and identify areas of CPD to support teachers in the delivery of the computing curriculum.

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. The process of debug itself requires the children to assess their own work.

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 teachers 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.

Summative Assessment

Teachers check the progress of their pupils as they progress through the different units across the school. Children are encouraged to assess their own understanding and skills and discuss their own progress and targets to work on.

At the end of each half term, teachers are asked to identify which meet age related expectations, which children need support to meet age- related expectations and which children are working beyond age related expectations. This assessment is submitted to the computing leader at the end of each unit of work.

Espresso

Children's individual projects in the coding activities can be stored on Espresso to demonstrate they can apply their understanding of the concepts taught.

4. Planning and Resources

Planning

Teachers use the Pippins long term plan (Whole School overview document) and the Teach Computing documents to deliver the computing curriculum. 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, which will prepare them for the work that will be covered in the following years. Throughout the scheme, E-Safety is embedded to ensure the safe and responsible use of technology. Recognising the importance of online safety, at the start of each half term an element of online safety is discussed through and activity, scenario, story or video to keep discussions regarding online safety prevalent.

Resources

Computing Suite

There are 27 computers and one teacher computer, each having access to a range of programmes that can meet the needs of the new programme of study. We also have some laptops to support independent learning for some children, allowing computing work in the classroom environment.

iPads

Each teacher has an iPad for use in the classroom. Apps can be shown on the interactive whiteboards through Apple TV to support all curriculum areas including computing.

Classroom Computers

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

Printers and Photocopiers

There is one colour photocopier which is networked to each computer.

Interactive Whiteboards

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

Other Resources to support the curriculum

- Beebots and mats
- Digital Cameras
- Headphones (with and without microphones)
- microphones
- Microsoft Teams for all children
- All children in Key Stage 2 have a personal email account which is monitored
- Education City/ Espresso and Espresso coding / Sumdog / Timestables Rockstars

5. Organisation

Each class has a timetabled session in the computer suite and additional time slots can be booked when needed. There are 6 topics, one for each term throughout the year.

6. EYFS

EYFS are introduced to computing at an early stage. They are given the opportunity to explore technology through a range of equipment and through roleplay.

7. KS1 and KS2

At Pippins, 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.

Key Stage 1 - Subject Knowledge

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.

Create and debug simple programs
When a child programs a toy which doesn't perform the task as expected, they will be required to alter the programming to enable the toy to follow the instructions as intended.

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.

Use technology purposefully to create, organise, store, manipulate and retrieve digital content.
Creating digital content has many practical possibilities. These include commonplace tasks 7 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.

Recognise common uses of information technology beyond school
There are many opportunities for pupils to consider the applications of algorithms, programs and 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
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 a focus on a story about e-safety, and communications to parents in line with national guidance on safer internet use at home. (Safety Internet Rules)

Key Stage 2 - Subject Knowledge

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.

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.

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
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, Kodu 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.

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 cables

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 features7 of the search engine, including searching for phrases rather than keywords, or limiting searches to a particular time frame, language, reading level or website.

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).

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, resulting from COPPA10 legislation). 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. (Safety Internet rules)
As well as the emphasis on this aspect in lessons, the school also celebrates the annual national 'Safer Internet Day'. This includes listening to and discussing a story about an aspect of e-safety and communications to parents in line with national guidance on safer internet use at home.

8. Equal Opportunities
Pippins School will ensure that all children are provided with the same learning opportunities regardless of social class, gender, culture, race, disability or learning difficulties. As a result, we hope to enable all children to develop positive attitudes towards others. All pupils have equal access to computing and all staff members follow the equal opportunities policy. Resources for SEN children and children who are working at greater depth are made available to support and challenge appropriately.

9. Inclusion
Work in computing is frequently group or paired work using the computers in the computing suite or a more practical activity using the Beebots or iPads. Independent activities should take place at available points for assessment purposes.
At Pippins, 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 without access to computers at home have the opportunity to complete computing homework activities in the computer suite on Wednesday lunchtimes.

The UN Convention on the Right of the Child
We acknowledge that the internet is an exciting place with a wealth of learning opportunities for children but also has risk and as such, as a rights respecting school, we ensure that children and parents are given information and advice to help them to understand how to use the internet and how to keep themselves safe online. It is crucial that children are taught what to do if they find something online that makes them feel uncomfortable.

10. Role of the Subject Leader
The computing leader will assess and address staff training needs as part of the annual development plan process or in response to individual needs and requests throughout the year. Individual teachers should attempt to continually develop their own skills and knowledge, identify their own needs and notify the leader. Teachers will be encouraged to use ICT and computing to produce plans, reports, communications and teaching resources. The leader will provide on-going staff training to ensure teachers are confident in delivering the curriculum in a range of contexts. The computing leader will support staff to overcome technical issues with computing technology at the school. They will also liaise and access support from Cyber Support, as and when required.

11. Parents
Parental involvement is highly encouraged. E-safety presentations have been held previously and parents can be encouraged to learn code along with their children at home.

Additional documents:
Computing Whole School Overview
Safer Internet Rules

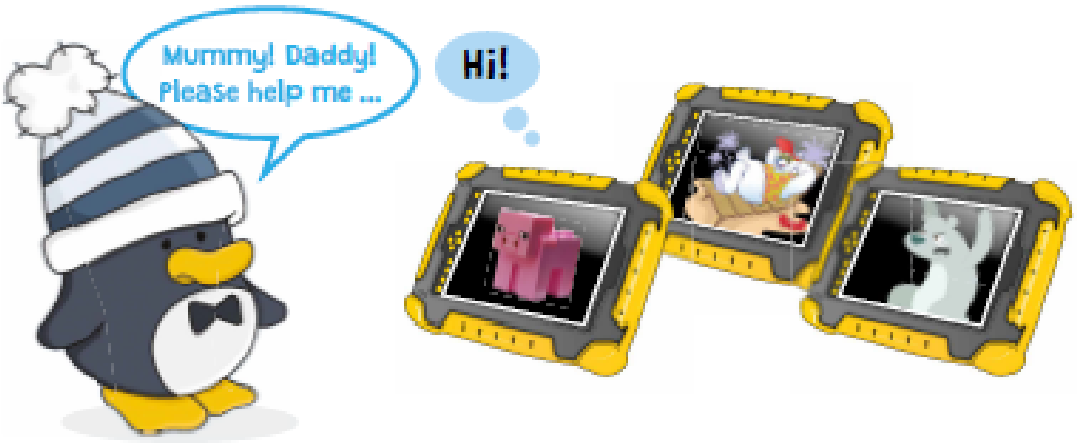
Whole School Long Term Map

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
	Computing systems and networks	Creating media	Programming	Data and information	Creating media	Programming
EYFS	Games linked to the curriculum on iPad/IWB	Games linked to the curriculum on iPad/IWB	Beebot - programming	ICT Suite Developing mouse control / logging in	ICT Suite 2Simple – Paint a picture	ICT Suite Using the computers/ Simple City
Y1	Technology Around Us	Digital Painting	Moving a Robot	Grouping Data	Digital Writing	Programming Animations
Y2	Information Technology Around Us	Digital Photography	Robot Algorithms	Pictograms	Making Music	Programming Quizzes
Y3	Connecting Computers	Stop Frame Animation	Sequencing Sounds	Branching Databases	Desktop Publishing	Events and Actions in Programs
Y4	The Internet	Audio Editing	Repetition in shapes	Data Logging	Photo Editing	Repetition in Games
Y5	Sharing Information	Video Editing	Selection in Physical Computing	Flat File Databases	Vector Drawing	Selection in quizzes
Y6	Internet Communication	Webpage Creation	Variables in Games	Introduction to Spreadsheets	3D Modelling	Sensing

EYFS and Key Stage 1 Online Safety Poster

Smartie the Penguin

If anything happens online that makes **Smartie the Penguin** feel worried, upset or confused, he doesn't try to fix things by himself ...

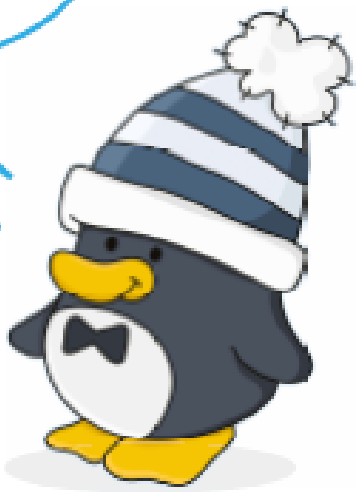


Always ask an adult for help!

He stops ...

Thinks about what to do ...

And always asks an adult for help!



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www.childnet.com/smartie

Key Stage 2 Online Safety Poster