Computing Policy

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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 Buterknowle Primary, 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 Butterknowle Primary, 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 long term plans developed in conjunction with Durham County Council's progression documents. We have a computing suite equipped with laptops/PCs and a set of 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 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. Teachers are able to apply children's computing skills to supplement their learning across the curriculum where misconceptions and knowledge gaps in computing can also be addressed. 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 Butterknowle Primary 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 IT in lessons is also an essential part of preparing engaging, fast moving, motivating lessons for pupils. The Computing co-ordinator will keep 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; 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 as they wish.

2. 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.

4. Planning and Resources

Planning

Butterknowle Primary School's Computing Long Term Plan has been developed in conjunction with Durham County Council's progression documents and advice from DCC's Advisory staff. It covers the programme of study for computing, including programming and computational thinking and supports clear progression of skills throughout school. E-Safety is embedded to ensure the safe and responsible use of technology. Buterknowle Primary has a range of software to deliver the new programme of study.

Resources

Computing Suite

There are 10 laptops supplemented by 6 desktop PC, which will be replaced by further laptops when possible, each having access to a range of programmes that can meet the needs of the new programme of study.

iPads

Each teacher has an iPad for assessment and classroom administration purposes. We have a set of 12 iPads for use within the classroom to support the programme of study.

Interactive Whiteboards

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

Other Resources to support the curriculum

- Beebots
- Digital Cameras
- microbits

5. Organisation

Computing will be taught in planned and arranged into half-termly blocks which may be taught discretely or linked into class topics by the class teacher

6. EYFS

EYFS are introduced computing at an early stage. They are given the opportunity to explore appropriate units of work for pre-readers found on the iPads (e.g. code.org).

7. KS1 and KS2

At Buterknowle Primary, 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. 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. 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 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 consider 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 KS1 assembly about e-safety, led by the coordinator and communications to parents in line with national guidance on safer internet use at home.

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.
As well as the emphasis on this aspect in lessons, the school also celebrates the annual national 'Safer Internet Day'. This includes a KS2 assembly about e-safety, led by the coordinator and communications to parents in line with national guidance on safer internet use at home.

8. Equal Opportunities
Buterknowle Primary 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 can be individual, paired or grouped using the computers in the Computing Suite or perhaps Beebots or iPads. At Buterknowle Primary, 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.

10. Role of the Subject Leader

The computing coordinator 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 coordinator. Teachers will be encouraged to use ICT and computing to produce plans, reports, communications and teaching resources. Individual tutorials are available for the different software needed to deliver the new curriculum. These are differentiated for basic skills, intermediate skills and advanced skills. The co-ordinator will provide on-going staff training to ensure teachers are confident in delivering the new curriculum in a range of contexts. The computing coordinator will support staff to overcome technical issues with computing technology at the school.

11. Parents

Parental involvement is highly encouraged, especially if there is a specialist subject being taught within a class. Code mornings have been held previously and parents can be encouraged to learn code along with their children at home.

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