Computing Rationale

"A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world."

Department for Education, 2014

The 'combination of principles, practice and invention makes computing an extraordinarily useful and intensely creative subject, suffused with excitement, both visceral ('it works!') and intellectual ('that is so beautiful').

Computing at School 2012

Intent

At Bilton Grange Primary School, we understand that, in such a rapidly evolving world, technology is an integral part of our children's lives - and futures. We intend to equip our children with the essential knowledge and skills to contribute to the digital world safely, responsibly and respectfully.

Computing is a practical, creative and knowledge-rich subject. Our cross curricular approach is 'knowledge rich', and carefully builds upon the children's previous knowledge with small sequential steps. Underpinning this approach are our four curriculum drivers (the 4 C's):

Communication ***Collaboration*** ***Creative Arts*** ***Community***

These 4 C's are at the heart of everything we do and enable children to gain the 'essential knowledge', skills and experiences to succeed. It is crucial that these learning experiences take children beyond their daily lives so that they are exposed to, and better prepared for, today's digital world and the future.

Substantive and Disciplinary Knowledge in Computing

Our Computing curriculum uses a knowledge-based approach to learning. This allows teachers to ensure learning is developed systematically, building on previous knowledge in order to help children know more and remember more over time.

Substantive Knowledge in Computing is based on the key concepts of Computing – Digital Literacy, Computer Science and Information Technology. In our Computing curriculum, this Computing knowledge and enquiry is taught within real-life contexts (where possible) including key vocabulary and knowledge sentences. Progressing from EYFS to year 6, children build on prior knowledge in a sequence of small steps.

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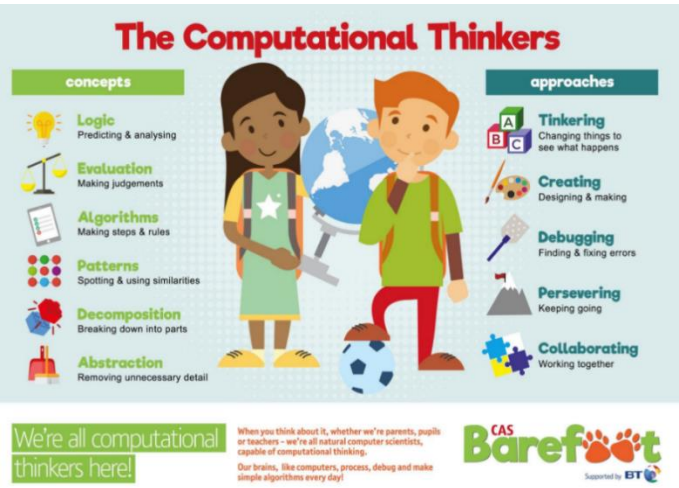

Disciplinary knowledge in Computing involves children applying what they have learned to real-life situations by planning/ designing, creating, editing and evaluating a range of applications. Computational thinking enables children to work out exactly what to tell the computer to do using a range of concepts and approaches. With links to R.S.E. children will use problem solving skills to investigate dilemmas relating to online conduct and relationships.

The National Curriculum

Computing knowledge, skills and understanding are taught across the following three areas:

- In **computer science**, pupils are taught about the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming.
- In **information technology**, pupils are taught how to use programs and computer systems to create and develop their ideas.
- In **digital literacy,** pupils are taught how to use online technologies safely, effectively and responsibly.

The National Curriculum Computing Curriculum 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.

By the end of EYFS and each key stage, we expect our pupils to know, apply and understand the following:

EYFS (taken from EYFS September 2021)

"Three areas are particularly important for building a foundation for igniting children's curiosity and enthusiasm for learning, forming relationships and thriving.

Computing Rationale

These are the prime areas:

• communication and language

• physical development
• personal, social and emotional development

The four specific areas, through which the three prime areas are strengthened and applied are:

• literacy
• mathematics
• understanding the world
• expressive arts and design" EYFS March 2021

Despite computing not being explicitly stated within the EYFS statutory framework, there are many opportunities for young children to use technology to solve problems and produce creative outcomes. In particular, many areas of the framework provide opportunities for pupils to develop their ability to use computational thinking effectively.

Key stage 1 (NC2014)

- 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.

Key stage 2 (NC2014)

- 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.

British Values and Cultural Capital

- Within the school's 4 Cs, a balance of activities is provided to help support the learning of fundamental British values. They also support the provision for personal development and in enhancing children's cultural capital within Computing. For example, to know more about '*contributing positively to life in modern Britain,* children learn how to leave a positive digital footprint. Through knowing how to use technology safely, respectfully and responsibly, the children recognise fundamental British Values of '*democracy*' and '*civil and criminal law*'.

Spiritual, Moral, Social and Cultural Education

- Weaving spiritual education through computing provides opportunities for reflection of awe and wonder about the digital achievements thus far, and possibilities for the future. Moral education in computing helps pupils to explore aspects of real and imaginary situations, enabling them to reflect on the possible consequences of different actions and situations. It can raise issues and moral dilemmas, such as whether it is right to have age restrictions. Social education involves collaborative work which encourages social development. Computing can also help pupils to express themselves clearly and to communicate. Cultural education will allow pupils to explore how developments in technology have changed our culture, particularly through the rise in social networking sites and the ability to communicate instantly across the world.

Implementation

EYFS In the EYFS, children have access to iPads and other forms of technology as part of their continuous provision. Each domestic role-play is equipped with real life technology to enhance their imaginative play. The children's knowledge of everyday information

technology is used to encourage skills to be developed. We build on this in KS1 by using the computer suite to develop children's skills during discrete lessons.

Key Stages 1 and 2

- The **National Centre for Computing Education (NCCE)** scheme of work is used for planning each Computing unit of work.
- We currently subscribe to **'Purple Mash'** which is linked to the NCCE scheme of work and provides Computing curriculum support and CPD for Bilton Grange staff. Suggested resources include **Purple Mash units**. However, 'Purple Mash' is not intended to be the only resource used. Other learning platforms, software and apps will be integrated and used where appropriate so that children experience a range of high-quality learning opportunities.
- To cover Digital Literacy, we follow '**Education for a Connected World' 2018** by UKCCIS **(UK Council for Child Internet Safety.** The **PSHE** strand **Media, Literacy and Digital Resilience** is also covered through Digital Literacy lessons.
- Additional to all pupils' timetabled Digital Literacy, Bilton Grange participates in **Safer Internet Day** every February.

- Within each key stage, units of work are planned on a medium-term planning template which identifies:
  - Over-learning and pre-learning activities
  - Details of the 'wow' starter and learning 'end point'
  - The objectives to be taught- separated into substantive (red) and disciplinary (blue) content.
  - The essential knowledge statements to be taught in the unit
  - The learning sequence
  - The key vocabulary to be taught- separated into horizontal and vertical vocabulary
  - Activities for each of the school's 4 Cs
- Learning is planned sequentially to enable children to build upon prior learning and to acquire new knowledge over the duration of the unit.
- At the beginning of each unit of work, children complete an over-learning recall activity to retrieve essential knowledge from previous learning pertinent to the unit. This identifies any gaps in knowledge, enabling the teacher to provide additional support for children who have gaps in their previously acquired essential knowledge.
- Children complete a pre-learning activity prior to the topic being taught. This identifies the essential knowledge children already know and enables teachers to provide additional support or challenge throughout the unit for individual children.
- The essential knowledge identified in each unit provides the basis of the knowledge sentences to be shared with children. These are chanted and

referred to throughout each lesson, helping children place the knowledge in the long-term memory.

- To deepen understanding, disciplinary knowledge enables children to interpret and reason their substantive knowledge across a range of different contexts.
- Vocabulary is split into vertical and horizontal deepening. Vertical deepening enables children to learn new vocabulary within the unit, building upon previously learnt vocabulary each year. Horizontal deepening enables children to see how the vocabulary can be used in range of different subjects and contexts.
- We have created deliberate and purposeful links between Computing and other disciplines such as PSHE, Maths, Music, Art and Design, in order to promote creativity. Children access computing across all areas of the curriculum, so that they utilise appliances and devices to communicate ideas and develop their Computing experience further. Computing makes links to real life so that children can see where this 'fits' in the world around them.
- Following each unit of work, children complete the pre-learning activity containing the essential knowledge for the unit. This occurs 2 weeks, 6 weeks and 12 weeks after the unit has been completed. Recalls provide opportunities for children to recall previous learnt knowledge and for teachers to track children's progress. During these sessions, any gaps in knowledge are discussed and children are supported in remembering this knowledge.

Impact

- The 2/6/12 recalls support the assessment of children. Results are added to tracking grids which, over the year, help support an end of year judgement in the subject.
- A subject monitoring week is conducted every year. This ensures that the subject leader has a clear understanding of the strengths and weaknesses of how the subject is being delivered throughout the school. This monitoring week includes:
    - Learning walks
    - Evidence of unplugged learning – in books and digital learning in digital files
    - Planning scrutiny
    - Data/assessment scrutiny
    - Interviews with children
- From this, the strengths and AFIs for the subject are developed and communicated to all staff and governors. Any immediate actions will be put in place quickly. Medium/long term actions will be added to the School Improvement Plan.
- Moderation within the subject is completed once a year. Teachers have the opportunity to share examples of work and check the accuracy of their teacher assessment judgements.