

GREAT HORWOOD CHURCH OF ENGLAND SCHOOL

COMPUTING CURRICULUM STATEMENT

OUR VISION

We are great programmers when we have the opportunities to:

- understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- be responsible, competent, confident and creative users of information and communication technology
- use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns
- communicate ideas well by utilising appliances and devices throughout all areas of the curriculum

At Great Horwood Church of England School, the academic, emotional and spiritual well-being of all individuals is at the heart of all that we do; where everyone is valued. We are a safe, welcoming school within the heart of the village community that aims to provide all our children and adults with the learning opportunities to flourish, be healthy, grow in resilience and realise their full potential; being fully equipped and prepared for a successful future.

Our aim is to foster a love of learning where pupils' curiosity is encouraged enabling them to confidently explore and discover the technological and digital world around them. In our everchanging world, pupils need to have the knowledge, skills and attitudes to learning that will enable them to flourish and succeed. Through our practical curriculum, we aim to inspire and excite our children and foster a thirst for this knowledge. We believe that computational thinking is vital in helping children to solve problems, design systems, and understand the power and limits of human and machine intelligence. Furthermore, it is a skill that empowers, and one that all pupils should be aware of and develop competence in. Pupils who can think computationally are better able to conceptualise, understand and use computer-based technology, and so are better prepared for today's world and future.

Aims and Purposes of Computing:

"A high-quality computing education which equips pupils to use computational thinking and creativity to understand and change the world. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Computing ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through information and communication technology – at a level suitable for the future workplace." National Curriculum 2014

Computing allows pupils to engage in an increasingly technological world. Our aims are to fulfil the requirements of the National Curriculum for Computing whilst also providing enhanced collaborative learning opportunities, engagement in rich content and supporting pupil's conceptual understanding of new concepts which support the needs of all our pupils. At the core of the computing curriculum

are the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming.

Building on this knowledge and understanding, we intend for our children to use information technology to:

- create programs, systems and a range of content
- ensure that pupils become digitally literate and digitally resilient
- enable them to use, and express themselves and develop their ideas through, information and communication technology
- develop their ideas through, information and communication technology at a suitable level for the future workplace and as active participants in a digital world

The aims of our Computing Curriculum are to develop pupils who:

- Are responsible, competent, confident and creative users of information and communication technology
- Know how to keep themselves safe whilst using technology and on the internet and be able to minimise risk to themselves and others
- Become responsible, respectful and competent users of data, information and communication technology
- Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- Can analyse problems in computational terms and have repeated practical experience writing computer programs in order to solve such problems
- Can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- Become digitally literate and are active participants in the digital world
- Are equipped with the capability to use technology throughout their lives
- Understand the importance of governance and legislation regarding how information is used, stored, created, retrieved, shared and manipulated
- Have a 'can do' attitude when engaging with technology and its associated resources
- Utilise computational thinking beyond the Computing curriculum
- Understanding the E-Safety messages can keep them safe online
- Know who to contact if they have concerns
- Apply their learning in a range of contexts, e.g. at school and at home
- Know where to locate the CEOP button and how to use it

Curriculum Intent for Computing across Foundation Stage, Key Stage 1 and Key Stage 2

<u>INTENT</u>

The use of information and communication technology (computing) is an integral part of the national curriculum. Computing has become part of the way we all work and entertain ourselves. Almost everything we do at school now involves the use of computing; online lessons & remote learning, research, presentation, recording, video and imagery, teaching plans and resource materials; lesson delivery via either interactive whiteboard or visualiser; communication by e-mail; document distribution and storage; assessment information analysis; production and editing of reports.

We aim for our children to be digitally literate. Through teaching computing, we facilitate children's participation in a world of rapidly changing technology. We enable them to find, explore, analyse,

exchange and present information. It is our intention that our children become responsible users of technology and can use the internet respectfully and safely; developing the necessary skills for using information in a discriminating and effective way. This is a major part of enabling children to be confident, creative and independent learners. At Great Horwood School, we use the Kapow scheme of learning for computing, ensuring that across the year groups foundations are laid for new learning to be built upon. The Kapow curriculum sequences learning, in an age-appropriate manner, providing pupils with the fundamental skills to be both safe and knowledgeable when using technology.

Computing encompasses three key areas:

- computer science (programming and understanding how digital systems work)
- information technology (using computer systems to store, retrieve and send information)
- digital literacy (evaluating digital content and using technology safely and respectfully)

<u>EYFS</u>

In the Foundation Stage, our young digital citizens develop a greater understanding of the world by recognising a range of technology that is used in their homes and school. Through experimenting with a range of different equipment such as iPads, laptops, chrome books, cameras, microphones and mechanical toys, the children will begin to speculate on why things happen or how things work and interact with age-appropriate computer software.

Understanding the World (UW) is one of the four specific areas of learning in the EYFS framework. It involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology, and the environment.

Children's basic needs for information and the development of communication skills are key to their success in life. Engagement with computing achieves the best outcomes when children's encounters with computing are enhanced by adults. When used across all areas of the Early Years Foundation Stage, it will offer opportunities for children to:

- Work as part of a group, taking turns and co-operating;
- Increase their vocabulary through conversations and discussions;
- Develop their creativity and imaginative play;
- Increase their knowledge and understanding of the world;
- Include activities that involve investigation, exploring and solving problems.

Key Stage 1 and Key Stage 2

In KS1 and KS2, computing is taught through all three strands in each year group, but the subject knowledge 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.

Computational knowledge and understanding is presented in a variety of ways using skills taught in English, mathematics, science, design & technology and art to develop more meaningful learning experiences. We believe children should be taught computing content through a variety of hands-on learning experiences to develop them as technologists. The teaching of computational vocabulary is key for our children.

We endeavour to ensure that the Computing curriculum we provide will give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.

We believe that levels of computing capital (cultural capital and social capital) can be increased by:

Engaging parents

- Involving parents in children's computing education. This could be via collaborative home learning or initiatives that work with parents directly.
- Letting parents know its OK not to know the answers to everything children ask about computing, and promoting "I don't know, let's see if we can find out".
- Supporting parents by hosting internet safety sessions, led by external CEOP ambassadors.

Revealing the relevance of science

- Exploring how a particular area of the STEM curriculum is relevant to real life.
- Highlighting the different careers that are related to topics taught in school.

Challenging popular stereotypes

- Presenting STEM as an exciting concept with a range of opportunities.
- Challenging gendered attitudes around appropriate career choices for boys and girls.

Being aware of language

- Introducing the variety of computing-related jobs from an early age. For example, our Key Stage 1 and 2 workshops cast children in the role of 'structural engineer' and build their understanding of subject, context, and career possibilities.
- Highlighting that the English language is inherently gendered, and the role this can play in defining children's norms and identities.

Creating different opportunities for children to explore STEM

- Providing opportunities for children to explore STEM at museums, galleries and science centres.
- Increasing contact with people who work in STEM jobs by bringing them into the classroom to talk about their work. This might include parents.

IMPLEMENTATION

Computing is taught using a blocked curriculum approach. This ensures children can develop depth in their knowledge and skills over the duration of each of their computing topics. Teachers use Kapow to plan and teach their computing lessons. Kapow supports the development of knowledge and skills across the computing curriculum, helping staff and pupils to build a solid foundation of essential knowledge and skills.

Knowledge and skills are mapped across each topic and year group to ensure systematic progression. Each class has a set of either laptops or chromebooks to ensure that all children 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

The implementation of our computing curriculum ensures that when children leave Great Horwood CE School, they are competent and safe users of ICT with an understanding of how technology works. They will have developed skills to express themselves and be creative in using digital media and be equipped to apply their skills in Computing to different challenges going forward.

By the end of Reception most children will attain the Development Matters outcomes for 5 yr olds

- Technology: children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.
- Being imaginative: children use what they have learnt about media and materials in original ways, thinking about uses and purposes. They represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role-play and stories.

and will be able to:

- Show an interest in ICT
- Know how to operate simple equipment
- Complete a simple program on the computer and / or perform simple functions on ICT equipment
- Find out about and identify the uses of everyday technology and use information and communication toys to support their learning.

By the end of Year 2, most pupils will attain the national curriculum outcomes for 7 yr olds and will be able 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.

By the end of year 6, most children will attain the age related expectations for 11 year olds and will be able 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.

Progression in Computing

	Years 1/2	Years 3/4	Years 5/6
Computer Science	 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 recognise common uses of information technology beyond school 	 Pupils should be taught to: design write and debug programs that accomplish specific goals, solve problems by decomposing them in smaller parts use sequence, selection and repetition in programs use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs recognise common uses of information technology beyond school 	 Pupils should be taught to: design, write and debug programs that accomplish specific goals; including controlling or simulating physical systems and solving 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
Digital Literacy	 Pupils should be taught to: use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content on the internet or other online technologies 	 Pupils should be taught to: Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact 	 Pupils should be taught to: use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact

	 Pupils should be taught to: 	 Pupils should be taught to: 	 Pupils should be taught to:
ICT	 use technology purposefully to create, organise, store, manipulate and retrieve 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 	 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

Safeguarding

Safety is paramount and all forms of technology should be checked out by adults before being used with children. We have ensured our child protection policies cover the use of technology by adults and children within the school.

The school complies with 'Inspecting Safeguarding in early years, education and skills settings' and appropriate filters and monitoring systems are in place to protect learners from potentially harmful online material.

Inclusivity and Equality

Where an EHCP specifies specialised computing equipment is required this will be acquired from the Buckinghamshire Council SEN IT team. For other SEN pupils equipment may be purchased from the School SEN budget and maintained by TurnItOn.

Lesson plans detail how learning is scaffolded in many ways to ensure equality of access to all children, enabling them to be inclusive to quality first teaching. For children from disadvantaged backgrounds, with special educational needs or who have English as an additional language, tasks may be broken down into smaller components, providing them with achievable goals. In this way all children will be enabled to achieve their full potential.

Great Horwood CE School is committed to promoting inclusivity and equality of opportunity for pupils with learning difficulties. When planning and teaching Computing staff will make reasonable adjustments to promote equality of opportunity for all pupils based on individual needs. This could include;

- allocating adult support
- providing additional support materials (e.g. visual aids such as photographs, Makaton symbols, concept boards)
- providing alternative resources e.g. switch technology, which is easy to manipulate, use of alternative materials for pupils with sight or hearing difficulties
- modifying tasks (e.g. working on the same objectives but with an alternative choice of media, recording work in different ways such as with a digital camera/ verbally/ with a tape-recorder)
- See also 'SEN Policy'

Wider impact of Computing

'Computing education must enable young people to continue to keep up with the pace of technological change so that they can remain effective, well-informed and safe citizen' (After the reboot: computing education in UK schools – Royal Society)

Computing is open to all children, of whatever age, gender, ethnic origin, ability and social background because it teaches children skills that will be essential for the modern world. Care is taken to avoid cultural or gender stereotyping when selecting resources and planning activities. Consideration should be given to the use of technology in different cultures. We will strive to celebrate computing achievements from around the world regardless of nationalities.

<u>SMSC</u>

Spiritual Development in Computing

Computing supports spiritual development by looking at how IT can bring rapid benefits to discussions and tolerance to an individual's beliefs. However, children are also exposed to the limitations and abuse of the internet where they question and justify the aims, values and principles of their own and others' belief systems.

Computing education provides opportunities for reflection of awe and wonder about the achievements of ICT today and possibilities for the future. Pupils have the opportunity to reflect on issues – such as how computers can sometimes perform better in certain activities than people. Pupils' spiritual development, their sense of self and will to achieve is promoted by teachers praising their contributions and endeavour.

They can:

- Reflect on their own and others' lives and the impact computer science has on this.
- Discuss the power and limitations that computing can have particularly on an individual's beliefs.
- Develop self-esteem through the presentation of work to others.
- Explore how ideas in computing have inspired others.
- Experiment with and trust their own beliefs and ideas.

Moral Development in Computing

Computing supports moral development by looking at how IT developments have had an impact on the environment as technology has meant that old ways of working have been changed to help the environment. Moral education in computing provides opportunities for pupils, 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 morally right to have computer games whose aim is killing and violence, reflecting on rules around these e.g. age. They also have opportunities to discuss whether it is right that some people in this country and in other countries do not have access to the internet; as well as debating the sharing/selling of personal data and the consequences.

Pupils:

- Are taught good etiquette when using digital technology, including mobile devices, with due regard to e-safety.
- Are encouraged to respect other people's views and opinions.
- Develop respect in the use of digital equipment and its impact on the environment ink and paper wastage.
- Explore moral issues around the use of digital technology copyright and plagiarism.

• Express their own responses and opinions of the work of others with a justification for their view.

Social Development in Computing

Computing supports social development by completing group work within lessons as well as practical tasks. Children are required to understand about social media and the advantages these sites have brought as well as the numerous problems such as cyber-bullying. Social education involves collaborative work which encourages social development. Computing can also help pupils to express themselves clearly and to communicate.

Pupils:

- Are encouraged to assist each other when problem solving.
- Use appropriate social behaviours and to interact as part of a caring community.
- Are taught good practice and respect in the use of social networking.
- Work collaboratively on musical projects.

Cultural Development in Computing

Pupils learn that the development in technology has impacted different cultures and backgrounds in different ways. More developed countries are able to keep pace with the developments in technology whilst less developed ones can't. Cultural education involves breaking though linguistic and cultural barriers through e-mailing or video contact across the world. New opportunities to communicate through different media are discussed; such as social media; are created. Pupils have opportunities to explore aspects of their own culture and they can also begin to make connections between different cultures.

Pupils:

- Use digital technology sensibly in the classroom and are encouraged to do the same at home.
- Are empowered to use and apply their computing skills to the wider curriculum.
- Respect and develop an awareness and appreciation of how differing cultural, spiritual and religious views might differ towards the use of digital technology.

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