Horn's Mill Computing Curriculum

'Coding is today's language of creativity. All our children deserve a chance to become creators not just simply consumers of computer science'

Maria Klawe

Curriculum intent:

At Horn's Mill, we aim to provide a progressive and purposeful computing curriculum that prepares our pupils for the modern world. Using a range of hardware and software, we aim to equip our children with the knowledge and understanding of how to use technology safely whilst understanding the benefits that it brings to our everyday lives.

Our computing curriculum has been carefully designed based upon the needs of the children in our school and has been written alongside computing experts at Manchester Metropolitan University and at our local feeder high school. The curriculum consists of both declarative knowledge (knowledge of facts, concepts and how these are related) with procedural knowledge consisting of methods and processes (how I create a coding sequence and use it to programme a MicroBit).

Our computing curriculum has been broken down into three strands. It is important to note that these strands are not separate entities but rather interconnected. Knowledge in one area can affect knowledge and acquisition in another. These strands are:

- *Digital Literacy* – In this area, children learn the importance of using technology safely, discerningly and effectively. In this area, pupils learn age-appropriate content that builds on prior knowledge.
- *Information Technology* – In this area, children learn how to use a range of pieces of software and hardware to help them complete a range of real life tasks. In this area children also learn how computing can transform our daily lives.
- *Computer Science* – In this area, children learn how to solve problems through logical thinking, algorithms and algorithmic thinking, pattern recognition, abstraction, debugging and evaluation.

The computing curriculum at Horn's Mill aims to be fully inclusive for all. As computational thinkers, children will explore a range of technological devices and be equipped with the skills and understanding to use technology safely in their daily lives. Our aims are to fulfil the National Curriculum through a broad and balanced coverage of essential skills and vocabulary. Key language has been identified in each year group that is progressive throughout our curriculum.

National Curriculum Expectations Key Stage 1:
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
- 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.

National Curriculum Expectations Key Stage 1:
Pupils should be taught 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.

Early Learning Goals	EYFS
Expressive Arts & Design - Creating with Materials: • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function Communication & Language - Speaking: • Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate. • Express their ideas and feelings about their experiences using full sentences, including use of past, present and future tenses and making use of conjunctions, with modelling and support from their teacher. Literacy – Word Reading: • Say a sound for each letter in the alphabet and at least 10 digraphs.	**Context for learning and key vocabulary** In the EYFS, children are exposed and given opportunities to explore a range of computing apparatus (both hardware and software) during continuous provision. This is based upon children's interests and in preparation for the National Curriculum in Team 1. The following objectives are explored throughout the foundation year. **Computer Science** • Explore beebots and other moving toys • Give a simple instruction to a moving toy • Verbally explain the simple instruction that has been given • Identify moving toys in the that are out in environment • Think about how some toys are controlled by computers/technology and others aren't. • Explore different types of hardware **Information Technology** • Find the letters on a keyboard of taught phonics. • Use a paint programme to create pictures and images • Take pictures of the environment using IPADs **Digital Literacy** • To know that the internet can be used to find information. • To recognise when an unfamiliar image, website or video appears on a device and to tell an adult.

	Computer Science	Computer Science	Information Technology	Information Technology	Digital Literacy	Digital Literacy
	key vocabulary is highlighted in red					
Year 1	• Recap how to make a toy or screen animal move (Bee Bot Toys or Bee Bot App on the IPads). • Explain how you programme a toy. *(Programme the toy to move around an area – Bee Bot Toys or Bee Bot App on the IPads).*	• Find machines/ toys that follow instructions. • Talk about how computers help to control machines and toys (Bee Bots and Bee Bot App).	• Type sentences on a keyboard understanding where the space bar is and the full stop button (Word on the Computers or Note on the IPads). • Draw on top of an image/photograph selecting different colours/brushes(Finger Paint App on the IPads).	• Select a sound clips to accompany an image (Word – On the class computers or Note on the IPads). • Take a photograph that matches a caption of writing (write a story then take a photo that matches it and put together either on a physical camera or an Pic Collage on the IPads).	• Point out titles, images etc on a website. • Predict the information you might find on a website (a football website will be about football). • Talk about differences between fiction/non-fiction on a website (story might not be true if it's about dragons).	• Explain that the internet can be used to access appropriate and inappropriate information and you can send any information/data (Manga High/Email – send messages, play learning games). • Explain how this information can be accessed by any individual on the internet (Discuss how any pupil with internet can access MH/email or pictures anywhere in the world).
Year 2	**Computer Science** • Learn how to plan and write down instructions to move a toy/screen turtle (use Word on the computers or Note on the IPads to record). • Predict what will happen with instructions (Once written, will they work following the sequence of instructions (Bee Bots App or toys). • Programme and then test a friend's instructions (Have a go and see if they work!). • Understand that programmes (Bee Bots) execute by following precise and unambiguous instructions.	**Computer Science** • Evaluate, debug and test new instructions (once used instructions see if they worked and make amendments).	**Information Technology** • Type sentences on a key board identifying mistakes and how to change them (Word on the computer or Notes on the IPads). • Add different effects to a picture (black and white) (Finger Paint App on the IPads).	**Information Technology** • Record simple sound effects using appropriate hardware and listen back to it (IPad Camera or class IPod) . • Take a photograph and add appropriate effects to match a piece of writing (I Motion App/Paint).	**Digital Literacy** • Talk about and explain the purpose of titles, images, sub-headings, links, content, search facility etc on a website. (Why is it there?) • Find information/data on a webpage about a specific subject (Google). • Explain whether a website contains fiction/non-fiction (Link to last year, content being fictional etc).	**Digital Literacy** • Understand and explain that certain information/data is private and this should not be published online (address etc). • Explain that all information/data published on the internet leaves a digital footprint. • Understand and explain that if a stranger approaches a child asking for private information or is unkind, I should tell an adult immediately.

Year 3	**Computer Science** • Use the term 'Algorithm' and understand that this simply means instructions. • Plan a sequence of algorithms to control movement on a Lego model that I have made. (Introduce Lego WeDo 2.0 on the IPads and the corresponding Lego trays). • Decompose algorithms by breaking them down into small parts to test and try.	**Computer Science** • Evaluate algorithms to see if they work and debug them. • Review and change an algorithm (make amendments so that it works).	**Information Technology** • Take photographs and experiment with different viewpoints (Ipod or IPad Camera) • Download a photograph to a programme (Word on the Computer or Note on the IPads).	**Information Technology** • Select what data/information and pictures are appropriate to include in an email (IPad Camera). • Write an email to a selected recipient and learn where to place the subject and recipient's email address (Father Christmas).	**Digital Literacy** • Read, explain their meaning and then sign both KS2 GDPR documents. • Explain whether a website contains fiction/non-fiction • Explain how to search for data/information on a website (word order/capitals changes 'hits'). (Google). • Explain how we decide whether or not to believe a statement on websites deciding if they are fact or opinion. • I can explain why people use passwords and learn the benefits of a strong password. (Howsecureismy password.net)	**Digital Literacy** • Understand and explain that any data/information posted on the internet can be accessed by anybody in the world and that this digital footprint is stored online. • Understand and explain behaviours that are acceptable on the internet and those that aren't (posting private information, sending pictures to strangers or hurtful email/Twitter messages). (For ideas see: http://www.digital-literacy.org.uk/Curriculum-Overview/Year3/Year-3-Sol-%281%29.aspx Lesson 5).
Year 4	**Computer Science** • Invent an algorithm to control movement or an event (Lego WeDo 2.0 on the IPads and corresponding Lego sets). • Evaluate an algorithm and abstract (remove) unnecessary elements of the algorithm. • Record a created algorithm (sequence of events). (Become competent using Lego WeDo 2.0 on the IPads and corresponding Lego sets)	**Computer Science** • Use logic to trial an algorithm (use the steps and see what happens). (Lego WeDo 2.0 on the IPads and corresponding Lego sets)	**Information Technology** • Understand and explain that the internet contains lots of information/data/images from different people and that some of this information is true whilst other information is not or could be an opinion (find examples of information that is true/is not).	**Information Technology** • Find two pieces of data/information on the internet about an event that contains two different viewpoints. • Summarise these viewpoints and type them onto a document to be presented with supporting pictures where appropriate (Word on the computers or Note on the IPads).	**Digital Literacy** • Read, explain their meaning and then sign both KS2 GDPR documents. • Explain how to decide if a statement on a website is true. **Link this information to radicalisation. Is the information true? Does it represent British Values? (Tolerance, diversity, Mutual Respect…)** • Select appropriate keywords to input in an internet search engine to get an accurate 'hit'. • Compare data/information generated by a search engine and locate the most appropriate 'hit'.	**Digital Literacy** • Understand that there are lots of agencies that can help when we have concerns about someone's behaviour online (cyberbullying, stranger danger and inappropriate messaging). • Discuss and then recall key contacts to report individuals too (NSPCC, Police, School).

Year 5	**Computer Science** • Invent an algorithm that creates an output (turning a light on the BBC Microbits). • I can change variables in an algorithm in order to achieve a desired output. • I can decompose a series of algorithms into smaller movements (BBC Microbits)	**Computer Science** • I can abstract unnecessary commands and then evaluate my algorithm. • I can test an algorithm for a specific purpose. (BBC Microbits)	**Information Technology** • Understand and explain how Microsoft PowerPoint works and how it can be used to present information in a formal and informal manner in a slideshow (PowerPoint). • Use a piece of hardware (mouse/keyboard) to input data onto Microsoft PowerPoint.	**Information Technology** • Input collected data into a graph and transfer the graph to another software programme (Transfer data from Excel to PowerPoint)	**Digital Literacy** • Read, explain their meaning and then sign both KS2 GDPR documents. • Compare information from two websites. • Discuss similarities and differences between websites and identify those that look suspicious – lots of adverts, popups and no lock/key at the bottom of the page. • Identify websites or features of a piece of information that are against British Values.	**Digital Literacy** • Understand and explain that social media software is not always safe (just because somebody has a picture or an image of a familiar face it doesn't mean it is them. Discuss photobrushing and strangers using images of someone else). • Develop and present checklist to veto 'friend requests' on social media websites. • Understand that what I post on the internet can provide me with an online reputation that can be traceable (E.g. racist,homophobic comments on Twitter).

Year 6	Computer Science	Information Technology	Digital Literacy	Digital Literacy
	• Independently create an algorithm and decompose it into different specific sections and input this onto an app (BBC MicroBits and Robots Microbit APP) . • Use logic to predict and analyse what will happen when I have finished creating my algorithm. • Create pattern algorithms (Know that if my Microbit follows a certain sequence of coding, the same output will happen each time). • Test, debug and evaluate the full set of algorithms. • Review and evaluate the algorithms identifying what worked and how it could be improved (BBC MicroBits and Robots).	• Record and input sound clips and then embed them into a PowerPoint presentation. • Explain and show how backgrounds, font style and colour impact an audience in a positive and negative manner (PowerPoint/Word). • Design and then create a presentation for a specific purpose that contains different font styles, a data graph, appropriate font colour and style and background (PowerPoint). • Save the presentation onto a piece of hardware (Memory stick). • Review the presentation identifying areas of strengths and weaknesses.	• Read, explain their meaning and then sign both KS2 GDPR documents. • Explain what the acronym WWW means. • Use a search engine accurately to find desired information (Google). • Refine a search to be more accurate using a variety of techniques (Capitals, word order and key words). • Identify and find useful websites containing relevant/appropriate information/data on a subject. • Independently check a website information's validity and reliability (Is it from a trusted source, who does it reference?)	• Understand and explain that mobile phones provide a quick and unregulated way to access the internet. • Understand and explain that information shared on mobile phones (through texts/pictures/FaceTime on the IPads etc) can be publicly accessed (Model a Facetime conversation where a screenshot can be taken and sent to others. (Link to sexting and online reputation management). Lesson 1 and 3). • Give reasons as to why a mobile phone number should only be given to close members of family/friends and any unwanted contact should be reported immediately.