Developing an approach to teaching and learning in Computing

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. 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. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also 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 and as active participants in a digital world.

DfE 2013

Aims

The national curriculum for computing 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 each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study. Children are assessed against school criteria at the end of a project. They make progress over time as they deepen understanding.

Our expectation

- Teachers follow the overview for learning, ensuring that all topics are covered
- Children experience a range of software as suggested in the overview
- Children experience a range of technology such as iPads, Chromebooks, PCs, cameras, etc.
- eSafety is taught explicitly twice a year and is referred to as appropriate when using technology
- Children work individually and in groups
- Teachers use collaborative feedback to support learning and understanding
- Children demonstrate their understanding of the knowledge and skills of a topic through an extended task or project
- Children use Google Classroom and the Google Suite to capture their learning
- Children evaluate their extended task/project using a narrative approach
- Samples of pupil evaluations and images of the projects will be captured in a class computing book. This book follows the class to show coverage and progress over time.

Implementation

There is no set time that Computing should be taught however the children must have suitable time to practise and apply the objectives of the Whole School Overview. Computing may be taught in a weekly lessons or blocked to give sustained time with the equipment.

Impact

The children should be given feedback in line with the school policy. The children must also be assessed against the objectives and recorded on Insight half termly and given a summative assessment at the end of the year.

Computing overview of learning

Wormley has developed its own overview of learning to meet statutory curriculum requirements and develop a curiosity of new technologies. The overview has been developed through consultation with practitioners, including a wide range of secondary computing specialist, to ensure the curriculum assists the children with being secondary ready. The scheme includes computer science, information technology, digital literacy, and the safe and appropriate use of technology.

Computer Science

The scheme has a dual emphasis. It is designed to support children in becoming safe, competent and creative users of technology, building essential skills and understanding through using a range of applications on varied devices. At the same time it inspires them to become productive creators and designers of technology, by introducing the essential aspects of computer science in a way which blends with the ethos and learning approaches of the primary phase. There is a particular emphasis on unplugged approaches, which enable learners to understand how technology and systems work and are controlled, before using any computer-based applications. The **data and programming** strands particularly include aspects related to computer science, but there are many elements embedded into other themes, so that this learning can be explored in varied contexts.

The strands

eSafety and appropriate use (Autumn 1 & Summer 2)	**This aspect is an essential element of the scheme and is embedded across all strands and learning themes as well as being covered in the autumn and summer terms explicitly.** Become safe, effective and respectful users of technology and online systems, recognising both acceptable and unacceptable behaviour and knowing how to respond when they have concerns. Respect copyright and ownership, asking permission before using materials and crediting sources. Understand the need to keep their personal information secure and recognise the need to respect the rights of others to personal privacy. *The children will*: experience general safe use of the computer; explore what to do if children find something that makes them feel uncomfortable; identify a range of ways to report concerns about content and contact from others; understand dangers of sharing personal information and importance of privacy; explore avatars and pseudonyms to protect identity; strangers online; understand the dangers of talking to strangers online through email, text, social media and gaming; consider how they know people are who they say they are? understand how to be safe when web browsing and not to always trust the information you see on websites (phishing, spam, scams, virus', pop ups; recognise acceptable and unacceptable behaviour online; understand the different forms of Cyber bullying including being a bystander; defaced images; identify rules of social media e.g. legal age; understand how to use social media safely respectfully; explore possible dangers that could arise when using social media.
Key skills (Autumn 1 & Summer 2)	Develop essential skills of navigating computing hardware and software. Word process with confidence and develop typing skills. Use word processing software efficiently to increase speed and enhance the product e.g. improve presentation. Efficiently store learning in the appropriate place for easy retrieval. *The children will:* use spell check and synonyms on Word; navigate a menu to open software independently; print own learning; practise typing - recognise most letters and number keys on the keyboard; open basic software with support increase typing speed change font style; increase size and colour; type to increase speed; save learning in an appropriate area; recognise all keys on the keyboard; use copy & paste

Communication (Autumn 2)	Develop an understanding of the networks and systems used for digital communication. Use a range of digital tools safely and appropriately for communication and collaboration to support learning in and beyond school. Keep personal information secure, respect the rights of others and demonstrate and promote good eSafe behaviour. *Children will:* be introduced to different types of communication in school and at home; understand telephone communication: mobile and landline; make a video call; use a class e-mail to compose and send a message; compose and send a group email; create and post text on a blog; create and post text on a blog and comment on another blog; compose and send an email with an attachment using CC.
Creating **(Spring 1)**	Select and use a range of digital applications purposefully on different digital devices to create, organise, manipulate, store, retrieve, review and present varied digital content (word-based, still and moving image, animation, sound etc.) for specific purposes. Combine digital materials from different sources to create digital content to achieve given goals. *Children will*: record a sound; take a photograph; take a digital photograph; sequence digital images to make a story; film a short video; create a presentation of information; compose a piece of music; film a mini-movie.
Data (Spring 2)	Derive data from a number of sources, including pictorial. Use digital research tools effectively, understanding broadly how they work and considering factors affecting search results. Evaluate the resulting data, refining and editing it to make it their own. Collect, organise, evaluate and analyse data to present it as information. Use a range of tools including databases (branch and flat file), spreadsheets and any form of graph, chart, diagram, table or list (eg. pictograms, bar and pie charts, line graphs, Carroll and Venn diagrams, mind maps etc.).. *Children will:* be introduced to the internet and how we can use it to search for information; collect and present data in a pictogram; collect and present data in a bar chart; collect and present data in a graph; collect and present data in a chart alongside a typed evaluation; enter data and formulae into a spreadsheet; add, edit, order and present data based on calculations; use a spreadsheet to solve problems.
Programming (Summer 1)	Develop an understanding of programming in the context of automated devices and systems as well as that of simulations and games. Relate this to the creation of algorithms and their implementation as programs, applying logical reasoning and precision and using decomposition to break problems into smaller parts. Design, create, test, debug and refine programs for specific purposes using different command languages and working in both onscreen and physical environments. Understand and use sequence, repetition, selection and variables appropriately to improve efficiency. Program inputs and outputs in physical and onscreen systems, including inputs from sensors and environmental monitoring. Predict the outcome of programs, using this to support good programming practice. *Children will*: program a bot to a destination; use an algorithm to program a Beebot to a destination; use an algorithm to program a Beebot to multiple destinations along a route; use different algorithms to create a pattern; write a program which accomplishes a specific goal; program an algorithm as a sequence of game instructions; use coding to design an animation with interactive user features.

We assess the children's progress against school objectives over a key stage.

Children reflect on their learning by narrating their learning, such as: A time I learned problem solving; A time when I learned collaboratively; A time when I tried a new technique.

A time when I learned ……

At first…	Then…..	After….