Computing at The Mill Academy

Rationale and Intent

All pupils at The Mill Academy have the right to have rich, deep learning experiences that balance all the aspects of computing. Computing, in general, is a significant part of everyone's daily life and children should be able to participate effectively and safely in this digital world.

Computing within schools can therefore provide a wealth of learning opportunities and transferrable skills explicitly within the Computing lesson and across other curriculum subjects. At The Mill Academy, the core of computing is Computer Science in which pupils are introduced to a wide range of technology, including laptops, iPads and interactive whiteboards, allowing them to continually practice and improve the skills they learn. This ensures they become digitally literate so that they are able to express themselves and develop their ideas through information and computer technology– at a level suitable for the future workplace and as active participants in a digital world. We aim for our children to have a breadth of experience to develop their creativity, resilience, problem solving and critical thinking skills to develop their understanding of themselves within their community but also a members of a global community and be a responsible digital citizen.

Implementation

In EYFS, children are immersed in activities which develop their computational thinking. 'Computational Thinking' is a set of problem solving skills that we can use in everyday life. We are required to ensure children's 'school readiness' and 'give them a broad range of knowledge and skills that provide the right foundation for good future progress through school and life' - Statutory Framework for EYFS March 2017.

Computational Thinking is at the heart of the computing curriculum and children will only be ready for this subject if we provide them with foundational experiences. The problem solving of Computational Thinking closely aligns with the Characteristics of Effective Learning. So by aligning EYFS provision to Computational Thinking, we use the same vocabulary as used by our colleagues in KS1, and ensure progression.

EYFS Computational Thinking simple definitions

EYFS Computational Thinking Skills	Simple definitions
Tinkering	Playing and exploring
Making	Making things, checking and fixing things
Collaboration	Playing and working collaboratively
Persevering	Not giving up
Logic	Anticipating and explaining is logical reasoning
Pattern	Grouping things, comparing, spotting similarities and differences, working out rules
Abstraction	Naming and labelling, working out what is important, sticking to the main theme, ignoring what is not important, creating a summary
Algorithms and Decomposition	Responding to instructions, ordering things, sequencing things, introducing storylines, working out different ways to do things, breaking problems down into steps

Sorting

Often, in school, we use the word sort when we ask children to spot what is the same about a set of items. For example, we use sorting hoops or sorting trays for children to group items by colour, shape, size, use etc.

Ordering and sequencing

For example, if we sorted the set of numbers '5,2,3,1' we might put them in order from smallest to largest resulting in '1,2,3,5'. We might call this ordering. Computer scientists would say they sorted or ordered the numbers. The term sequencing is also used to mean putting in some kind of order, such as sequencing a daily routine.

Grouping and naming

In computer science, we are often concerned with spotting common features of a set of items and naming that group. You might hear computer scientists use the term class for the name of a group, and the term generalisation used to describe the activity of working out a general group.

For example, I have a pet called 'Tibbles', and my friend has a pet called 'Fluffy'. Both of these pets have whiskers, sharp claws, and chase mice, one of them has long fur, the other short, they are both cats. Here we have two pets with similarities and differences, but they both belong to a general group, a class called 'cats'.

Grouping and naming is specifically mentioned in EYFS Development Matters guidance.

'Understanding - Speaking 40 to 60+ months - Extends vocabulary, especially by grouping and naming, exploring the meaning and sounds of new words.'

The act of creating groups is also mentioned in EYFS Development Matters guidance.

'Mathematics - Numbers - 30 to 50 months - Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.'

Abstraction

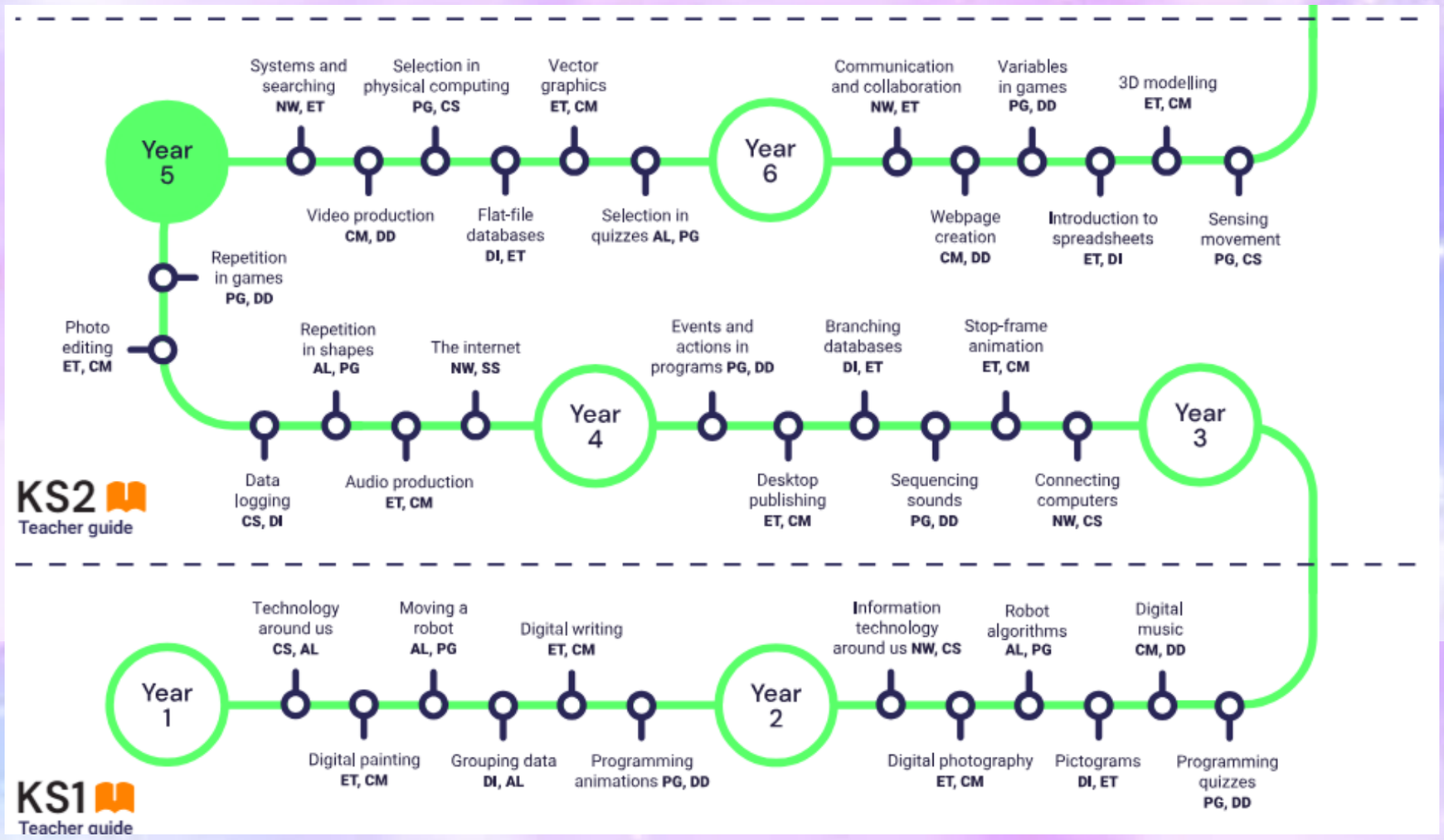
Abstraction can be described as working at the right level of detail for a task. We abstract as we summarise, as we ignore detail we don't need at that point in time. We abstract when we make a mind map. Decomposition is a type of abstraction. The word decomposition is often used to describe how we break something down into parts.

Teach Computing Curriculum

Journey

Key

AL Algorithms
CS Computing systems
CM Creating media
DI Data & information
DD Design & development
ET Effective use of tools
IT Impact of technology
NW Networks
PG Programming
SS Safety & security



KS1 and KS2

Computing is taught on a termly basis using the NCCE Teaching Computing Scheme to cover the three areas of the Computing National Curriculum: Digital literacy, Computer Science and Information Technology. Barefoot Computing is used in the Early Years Foundation Stage to provide the foundational experiences of computational thinking. We also aim to ensure that computing experiences are integrated into other areas of the curriculum and the basic skills are taught throughout the year through cross curricular work.

We ensure that our Computing curriculum excites the children to develop their computing skills and for them to further understand how this relates and strengthens their learning across the curriculum. Children have opportunities to see first-hand how the computing skills and knowledge they are learning can be used responsibly and successfully across many subjects.

The programmes of study are carefully planned and delivered showing progression, enabling children to develop computing skills and knowledge. Lessons are planned so that children learn the required skills and knowledge but curriculum links to other subject areas enable children to embed the skills that have learnt in a purposeful context. Children have access to a full range of resources to support their learning including laptops, I-pads, Bee-Bots, Mirco-bit kit and a large number of apps that are integral for their learning.

<u>Impact</u>

Our Computing Curriculum is well thought out and is planned to demonstrate progression and build on and embed current skills. We focus on progression of knowledge and skills in the different computational components and alike other subjects discreet vocabulary progression also form part of the units of work.

We measure the impact of our curriculum through pupil discussions and interviewing the pupils about their learning (pupil voice), monitoring with our subject computing lead, opportunities for collaboration between teachers , photo evidence and images of the pupils practical learning and their digital area on the school system to store work.

Children will be confident users of technology, able to use it to accomplish a wide variety of goals, both at home and in school. Children will become critical thinkers that can solve problems. They will be responsible, respectful and safe users of data, information and communication technology. Children will have a secure and comprehensive knowledge of the implications of technology and digital systems. This is important in a society where technologies and trends are rapidly evolving. Children will be able to apply the British values of democracy, tolerance, mutual respect, rule of law and liberty when using digital systems.

Computing and inclusion

At our school we teach Computing to all children, whatever their ability and individual needs. Computing forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our Computing teaching we provide learning opportunities that enable all pupils to make good progress. We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those with special gifts and talents, and those learning English as an additional language, and we take all reasonable steps to achieve this. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels. This ensures that our teaching is matched to the child's needs. We enable pupils to have access to the full range of activities involved in learning Computing. Our hardware can accept a range of input devices catering to pupils with specific difficulties. Where children are to participate in activities outside the classroom, for example, a visit to Computing exhibition, we carry out a risk assessment prior to the activity, to ensure that the activity is safe and appropriate for all pupils.

Strategies to support children with SEN

In Computing, we use a number of evidence-based strategies to support children with SEN. Strategies include:

Scaffolding

- Small, simple steps to success are modelled and displayed to help children complete tasks independently.
- Visual prompts; this may include graphics of icons and tools.
- Support for SEN children with learning vocabulary; this may include flash cards.
- Games/songs to support vocabulary learning.

All scaffolding follows a 'I do, you do, we do' approach.

Explicit Instruction

- All steps, processes and algorithms are modelled first.
- Teacher to use a think out loud when problem solving e.g when dealing with a pop up.
- Pupils may be supported in their thought process in Computing.
- Pupils will be given specific opportunities by adults to practise specific skills that are barriers to learning.
- Visual aids and concrete examples (where necessary) will be used to support learning.

Cognitive and Metacognitive Strategies

- Tasks may be 'chunked' into smaller steps.
- Vocabulary prompts may be used to support sentence work.
- Depending on ability, children with SEN may be asked to evaluate their own progress and discuss what they can do to move their learning forward.

Flexible Grouping/Fading

- Temporary groups may be established to support learning a particular concept.
- Pre-teaching and support with new processes, programs, vocabulary etc.
- Children may be paired in mixed ability to support needs.
- Prompt sheets may be used to support with ideas and planning.
- Checklists may be established to help with different processes. E.g logging on or accessing a new program.

Books for Computing, gaming and coding

Here is a list of books for young readers interested in computers and video games. There is an increasing thirst for books on this topic, which holds such a high interest to many young readers.

https://www.booksfortopics.com/booklists/topics/science-maths-computing/computing-gaming-coding/