Computing Progression Pathways – Mapped to Computer Science, Information Technology and Digital Literacy strands of the National Curriculum Programme of Study

**Pupil Progression**

**Computer Science**

- Understands what an algorithm is and is able to express simple linear (non-branched) algorithms symbolically, understands that algorithms need precise instructions. Demonstrates care and precision to avoid errors. (AL)
- Recognises that users can develop projects, and can demonstrate by building a simple program in an environment that does not rely on text e.g. programmable robots etc. Expects students to write and run programs. Understands that programs execute by following precise instructions. (AL)
- Understands that computers have no intelligence and that computers can do nothing unless a program tells them what to do. Recognises that all software and digital devices is driven by algorithms. (AL)
- Understands that algorithms are implemented on digital devices as programs. Designs simple algorithms using loops, and selection and if e.g. statements. Uses logical reasoning to predict outcomes and evaluates errors i.e. debugging, in programs. (AL)
- Recognises that a range of digital devices can be considered a computer. (AB) (GE) Recognises that there is a range of input and output devices. Understands how programs specify the function of a general purpose computer. (AB)

**Information Technology**

- Designs solutions (algorithms) that use repetition and two-way selection i.e. if-then-else. (AB) (DE)
- Knows the relationship between data representation and data quality. (AL)
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- Knows that computers collect data from various input devices, including sensors and application software. (AL) Understands the difference between hardware and application software, and their role within a computer system. (AL)
- Knows the relationship between data representation and data quality. (AL)
- Knows how to effectively use search engines, and knows how search results are selected; including that search engines use ‘web crawler’ techniques. (AB) (GE) (EV)
- Knows that computers transfer data in binary. (AB) Knows that digital computers use binary to represent all data. (AB) Understands how bit patterns represent numbers and images. (AB)
- Knows that computers data can be represented in binary. (AB) Understands the relationship between binary and file size (compressed). (AB)
- Recognises and understands the function of the main internal parts of basic computer architecture. (AB) Understands the concepts behind the fetch-execute cycle. (AB)
- Understands how search engines rank search results. (AL) Understands how to construct static websites using HTML and CSS. (AL) Understands data transmitted between digital computers over networks, including the internet i.e. IP addresses and packet switching. (AB)

**Digital Literacy**

- Designs solutions (algorithms) that use repetition and two-way selection i.e. if-then-else. (AB) (DE)
- Knows that computers collect data from various input devices, including sensors and application software. (AL) Understands the difference between hardware and application software, and their role within a computer system. (AL)
- Knows how to effectively use search engines, and knows how search results are selected; including that search engines use ‘web crawler’ techniques. (AB) (GE) (EV)
- Knows the relationship between data representation and data quality. (AL)
- Knows how numbers, images, sounds and characters use the same bit patterns. (AB)
- Defines data types: real numbers and Boolean. (AB) Knows that digital computers use binary to represent all data. (AB) Understands how bit patterns represent numbers and images. (AB)
- Knows that computers data can be represented in binary. (AB) Understands the relationship between binary and file size (compressed). (AB)
- Recognises and understands the function of the main internal parts of basic computer architecture. (AB) Understands the concepts behind the fetch-execute cycle. (AB)
- Understands how search engines rank search results. (AL) Understands how to construct static websites using HTML and CSS. (AL) Understands data transmitted between digital computers over networks, including the internet i.e. IP addresses and packet switching. (AB)

Computational Thinking Concept: AB = Abstraction; DE = Decomposition; AL = Algorithmic Thinking; EV = Evaluation; GE = Generalisation

For each of the Progression Pathway statements is underpinned by one or more learning outcomes (due for publication in 2014), providing greater detail of what should be taught to achieve each Progression Pathway statement and National Curriculum point of study.