Computational Thinking Concept:

- Understands what an algorithm is and is able to express simple (non-branching) algorithms.
- Understands that computers need precise instructions to do anything.
- Demonstrates care and precision to avoid errors. (AL)

- Understands that algorithms are implemented on digital devices as programs. (AL)
- Designs simple algorithms using loops and selection, i.e. if statements. (AL)
- Uses logical reasoning to predict outcomes.
- Detects and corrects errors i.e., debugging, in algorithms. (AL)

- Designs solutions (algorithms) that use repetition and two-way selection i.e., if, then and else. (AL)
- Uses diagrams to express algorithms. (AB)
- Uses logical reasoning to predict outcomes, showing an awareness of inputs. (AL)

- Understands that some problems cannot be solved computationally. (AL)
- Knows that users can develop their own programs, and can use them to create and solve problems in an environment that does not rely on text or code. (AL)
- Executes, checks and changes programs. (AL)
- Uses logical reasoning to predict outcomes. (AL)
- Demonstrates computational thinking as outlined in this guide, and can explain the different ways that they communicate information. (AB) (GE)

- Recognises that digital content can be represented in many forms. (AB) (GE)
- Understands that computers have no intelligence and that computers do not think. (AL)
- Realises that all software executed on digital devices is programmed. (AL) (GE)
- Knows what to do when confronted about content or being contacted. (AL)

- Designs algorithms that use arithmetic operators, if statements, and loops, within programs. (AL)
- Uses post-tested loop e.g., until, and a sequence of selection statements in programs, including an if, then and else statement. (AL)
- Demonstrates computational thinking as outlined in this guide, and can explain the different ways that they communicate information. (AB) (GE)

- Recognises different types of data: text, number. (AB) (GE)
- Recognises that a range of digital devices can be considered a computer. (AB) (GE)
- Recognises and can use a range of input devices and output devices. (AL) (AB)
- Understands how programs specify the output of a general purpose computer. (AB) (GE)

- Creates programs that implement algorithms to achieve given goals. (AL)
- Designs and assigns variables. (AB)
- Uses post-tested loop e.g., until, and a sequence of selection statements in programs, including an if, then and else statement. (AL)
- Produces a working program that can be run and can debug the program. (AL) (AB) (DE) (EV)

- Performs more complex searches for information e.g., using Boolean and relational operators. (AB) (GE) (EV)
- Evaluates and uses data and information, and recognised that poor quality data can be misleading results, and inaccurate conclusions. (AL) (EV)

- Knows that computers collect data from various input devices, including sensors and application software. (AB) (GE)
- Knows that the internet is a network of connected computer systems that use a common communication protocol. (AL) (DE) (EV)
- Demonstrates understanding of the internet and social networking. (AB) (DE) (EV)

- Understands the difference between data and information. (AB) (DE) (EV)
- Knows why storing data in a flat file can improve searching for information. (EV)
- Uses filters or can perform simple criteria searches for information. (AL) (GE)

- Recognises where information can be filtered on digital devices. (AL)
- Recognises that the design of an algorithm is complex and involves many different aspects. (AB) (GE)
- Recognises the ethical issues surrounding the application of information technology beyond school.
- Recognises what is acceptable and unacceptable behaviour when using technologies and online services.

- Uses the internet to communicate with a wider audience e.g., blogging. (AL)
- Demonstrates responsibility for what they say online and the impact it may have on others. (AL) (DE) (EV)

- Has practical experience of a small group or individuals and uses real world data. (AL)
- Evaluates the trustworthiness of digital content. (AL)
- Uses criteria to evaluate the quality of solutions, and identifies what is unacceptable and acceptable. (AL) (DE)

- Has practical experience of the internet. (AL)
- Recognises and understands the consequences of bad decisions and poor quality data. (AL)
- Uses criteria to evaluate the quality of solutions, and identifies what is unacceptable and acceptable. (AL) (DE) (EV)

- Understands the hardware and software associated with networking computer systems. (AL)
- Knows the purpose of the hardware and software associated with networking computer systems. (AB) (GE)
- Understands the client-server model including how dynamic web pages use persistent cookie and session data to allow users to access web applications. (AB) (GE)
- Recognises that persistence of data on the internet requires careful protection of online identity and privacy.

- Understands the hardware and software associated with networking computer systems. (AL) (GE)
- Has practical experience of a small (hypothetical) low level programming language, including variables and functions. (AB)
- Knows how to develop applications that have a wide range of uses, including games and simulations. (AB)
- Understands and can explain Moore’s Law. (AB)
- Understands and can explain how computers by. (AB) (DE) (EV)

- Obtains content from the world wide web using a web browser. (AL)
- Communicates safely and respectfully with others online, and the need for protecting personal information private. (EV)
- Knows common uses of information technology beyond school and beyond the classroom. (GE)
- Knows the purposes and how they work, for example, using MAC addresses. (AB) (GE) (DE)

- Talks about their work and makes improvements to solutions based on feedback received. (EV)

- Collects, organises and presents data and information in digital content. (AL)
- Creates digital content to achieve a given goal through combining packaging software and digital audio and video files to communicate with a wider audience e.g., blogging. (AL)

- Makes judgements about digital content when evaluating and repurposing it for a given audience. (AB) (GE) (EV)
- Recognises the audience when designing and creating digital content. (AB) (GE) (EV)
- Understands the potential of information technology for communication and collaboration. (AL) (AB) (DE) (EV)
- Uses criteria to evaluate the quality of solutions, and identifies what is unacceptable and acceptable. (AL) (DE) (EV)

- Evaluates the appropriateness of digital devices, internet and computing systems, and software for a range of goals. (AB) (GE)
- Recognises ethical issues surrounding the application of information technology beyond school.

- Recognises the potential of digital devices and application software to achieve given goals. (EV)
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- Understands the client-server model including how dynamic web pages use persistent cookie and session data to allow users to access web applications. (AB) (GE)

- Distinguishes between some of these forms of digital content. (AL)
- Demonstrates understanding of the internet and social networking. (AB) (DE) (EV)

- Recognises how search engines rank results, and in accurate conclusions. (AL)
- Recognises the potential of digital devices and application software to achieve given goals. (EV)

- Understands how search engines rank results, and in accurate conclusions. (AL)
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- Recognises that digital content can be represented in many forms. (AL)
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