Computing Threshold Concepts and Progression

Milestone 1	Milestone 2	Milestone 3
Coding Understand what algorithms are and that programs execute by following precise and unambiguous instructions. Create and debug simple programmes and use logical reasoning to predict the behaviour of simple programs.	**Coding** Write and debug programs that accomplish specific goals, including controlling or simulating physical systems. Solve problems by decomposing into smaller parts. Use sequence, selection and repetition in programs as well as working with variables.	**Coding** Design, write, debug and refine programs that accomplish specific goals. Use sequence, selection and repetition in programs including variables and inputs or outputs. Use logical reasoning and computational language to explain how algorithms work and their impact on the running of a program.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Understand that an algorithm is a set of instructions used to solve a problem or achieve an objective. Know that an algorithm written for a computer is called a program. Work out what is wrong with a simple algorithm when the steps are out of order. Know that an unexpected outcome is due to the code they have created and can make logical attempts to fix the code. Read code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program.	Explain that an algorithm is a set of instructions to complete a task. When designing simple programs, show an awareness of the need to be precise with their algorithms so that they can be successfully converted into code. Create a simple program that achieves a specific purpose. Identify and correct some errors. Program designs display a growing awareness of the need for logical, programmable steps. Identify the parts of a program that respond to specific events and initiate specific actions. For example; write a cause and effect	Turn a simple real-life situation into an algorithm for a program by deconstructing it into manageable parts. Designs show awareness of the desired task and how this translates into code. Identify an error within their program that prevents it following the desired algorithm and then fix it. Demonstrate the ability to design and code a program that follows a simple sequence. Experiment with timers to achieve repetition effects in their programs. Begin to understand the difference in the effect of using a timer command rather than a repeat command when creating repetition effects.	When turning a real-life situation into an algorithm, designs show awareness of the required task and how to accomplish this in code using coding structures for selection and repetition. Make make more intuitive attempts to debug own programs. Use of timers to achieve repetition effects are becoming more logical and are integrated into program designs. Understand 'if statements' for selection and attempt to combine these with other coding structures including variables to achieve the effects that are design in a program. As well as understanding how variables can be used to store information while a program is executing, be	Attempt to turn more complex real-life situations into algorithms for a program by deconstructing it into manageable parts. Test and debug their programs as they go and can use logical methods to identify the approximate cause of any bug but may need some support identifying the specific line of code. Translate algorithms that include sequence, selection and repetition into code with increasing ease and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures. Combine sequence, selection and repetition with other coding structures to achieve their algorithm design.	Turn a more complex programming task into an algorithm by identifying the important aspects of the task (abstraction) and then decomposing them in a logical way using their knowledge of possible coding structures and applying skills from previous programs. Test and debug their program as they go and use logical methods to identify the cause of bugs, demonstrating a systematic approach to try to identify a particular line of code causing a problem. Translate algorithms that include sequence, selection and repetition into code and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures, including nesting structures within each other.

	sentence of what will happen in a program.	Understand how variables can be used to store information while a program is executing. Designs for programs show ability to think of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures. For example, 'if' statements, repetition and variables. Make good attempts to 'step through' more complex code in order to identify errors in algorithms and can correct this. e.g. traffic light algorithm in	able to use and manipulate the value of variables. Mmake use of user inputs and outputs such as 'print to screen'. Designs for programs show that children are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures. For example, 'if' statements, repetition and variables. Trace code and use stepthrough methods to identify errors in code and make logical attempts to correct this. 'Read' programs with several steps and predict the outcome accurately.	Begin to think about their code structure in terms of the ability to debug and interpret the code later, e.g. the use of tabs to organise code and the naming of variables.	Coding displays an improving understanding of variables in coding, outputs such as sound and movement, inputs from the user of the program such as button clicks and the value of functions. Interpret a program in parts and can make logical attempts to put the separate parts of a complex algorithm together to explain the program as a whole.

Communication
Use technology purposefully to create, organise, store, manipulate and retrieve content and recognise common uses of information technology beyond school.

Safely retrieve digital content.

Communication
Understand computer networks, including the internet.

Use age appropriate search technologies and know how results are selected and ranked.

Understand that not all sources are reliable.

Use and combine given software to create and present content.

Communication
Understand how computer networks are set up and used and how they provide services and opportunities.

Be discerning when evaluating digital content.

Select a variety of appropriate software across digital devices to create a range of content that accomplishes specific goals.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sort, collate, edit and store simple digital content e.g. children can name, save and retrieve their work and	Demonstrate an ability to organise data using a database and can retrieve	List a range of ways that the internet can be used to provide different methods of communication.	Recognise the main component parts of hardware which allow	Understand the value of computer networks but are also aware of the main dangers.	Understand and can explain in some depth the difference between the internet and the World Wide Web.

Computing Threshold Concepts and Progression

follow simple instructions to access online resources. Understand what is meant by technology and can identify a variety of examples both in and out of school. Make a distinction between objects that use modern technology and those that do not e.g. a microwave vs. a chair.	specific data for conducting simple searches. Edit more complex digital data such as music composition. Confidently create, name, save and retrieve content. Use a range of media in their digital content including photos, text and sound. Effectively retrieve relevant, purposeful digital content using a search engine. Apply their learning of effective searching beyond the classroom. They can share this knowledge by publishing. Make links between technology they see around them, coding and multimedia work they do in school e.g. animations, interactive code and programs.	Use some of these methods of communication, e.g. being able to open, respond to and attach files to emails using Describe appropriate email conventions when communicating in this way. Carry out simple searches to retrieve digital content. Understand that to do this, they are connecting to the internet and using a search engine such as Purple Mash search or internet-wide search engines. Collect, analyse, evaluate and present data and information using a selection of software Consider what software is most appropriate for a given task. Create purposeful content to attach to emails.	computers to join and form a network. Improve their Understanding of the online safety implications associated with the ways the internet can be used to provide different methods of communication Understand the function, features and layout of a search engine. Appraise selected webpages for credibility and information at a basic level. Make improvements to digital solutions based on feedback. Make informed software choices when presenting information and data. Create linked content using a range of software such as Share digital content within their community, i.e. using Virtual Display Boards.	Recognise what personal information is and explain how this can be kept safe. Select the most appropriate form of online communications contingent on audience and digital content. Search with greater complexity for digital content when using a search engine. Explain in some detail how credible a webpage is and the information it contains. Make appropriate improvements to digital solutions based on feedback received and can confidently comment on the success of the solution. e.g. creating their own program to meet a design brief. Objectively review solutions from others. Collaboratively create content and solutions using digital features within software such as collaborative mode. Use several ways of sharing digital content.	Children know what a WAN and LAN are and can describe how they access the internet in school. Readily apply filters when searching for digital content. Explain in detail how credible a webpage is and the information it contains. Compare a range of digital content sources and are able to rate them in terms of content quality and accuracy. Use critical thinking skills in everyday use of online communication. Make clear connections to the audience when designing and creating digital content. Design and create their own blogs to become a content creator on the internet. Use criteria to evaluate the quality of digital solutions and are able to identify improvements, making some refinements.
Connect Use technology safely and respectfully, keeping personal information private.		**Connect** Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour,		**Connect** Use technology respectfully, responsibly and sensitively; recognise and identify potential risks and know how to report them.	

Computing Threshold Concepts and Progression

Identify where to go for help and support when there are concerns about content or contact on the internet or other on-line technologies.		Identify a range of ways to report concerns about content and contact.		Understand the impact of an on-line presence and how to be positive digital citizens.	
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Understand the importance of keeping information, such as their usernames and passwords, private and actively demonstrate this in lessons.

Take ownership of their work and save this in their own private space such as their My Work folder on Purple Mash. | Know the implications of inappropriate online searches.

Begin to understand how things are shared electronically such as posting work to an online display board.

Develop an understanding of using email safely and know ways of reporting inappropriate behaviours and content to a trusted adult. | Demonstrate the importance of having a secure password and not sharing this with anyone else.

Explain the negative implications of failure to keep passwords safe and secure.

Understand the importance of staying safe and the importance of their conduct when using familiar communication tools.

Know more than one way to report unacceptable content and contact. | Explore key concepts relating to online safety.

Help others to understand the importance of online safety.

Know a range of ways of reporting inappropriate content and contact | Have a secure knowledge of common online safety rules and can apply this by demonstrating the safe and respectful use of a few different technologies and online services.

Implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others. | Demonstrate the safe and respectful use of a range of different technologies and online services.

Identify more discreet inappropriate behaviours through developing critical thinking activities.

Recognise the value in preserving their privacy when online for their own and other people's safety. |