

## Concept Tracker – Computing Years 1-6

Objective: <b>UNDERSTANDING</b>	Date Assessed:	Limited Understanding	Able to mimic this with help	Off the gap list! Can explain and apply this	Can reason with this and use it in any context
<b>Programming</b> – Apply computer logic to write algorithms and programs that solve problems or control devices.					
<b>Programming Y1</b> Understands that an algorithm is a set of instructions that are followed precisely as you write them even if they are wrong. E.g. can apply this to simple robots.					
<b>Programming Y2</b> Has a model in their head that allows them to ‘try out’ a simple algorithm before it runs and so spot errors. They can apply this to debugging simple algorithms.					
<b>Programming Y3</b> Understands that computer code is a way of writing algorithms. E.g can debug simple syntax errors and spot lines of code in the wrong order.					
<b>Programming Y4</b> Understands the concept of ‘selection’ so that what the algorithm does, depends on what happens. E.g. can predict how to arrange the code for a robot that makes a noise when a light goes on. E.g. If.... Then.....					
<b>Programming Y5</b> Understands the concepts of a ‘procedure’ and a ‘loop’ in a programme. They can plan out how to solve a problem before building and testing a programme that solves it containing repeated sections.					
<b>Programming Y6</b> Has a model of the code in their head and so can write out their programme with ‘selection’, ‘procedures’ and ‘loops’ in before typing it in and testing it. They understand syntax such as If... then and while and understand that X=5 means that X is a variable which is read by the computer as if it were a 5 but X can change during the programme.					

Objective: <b>UNDERSTANDING</b>	Date Assessed:	Limited Understanding	Able to mimic this with help	Off the gap list! Can explain and apply this	Can reason with this and use it in any context
<b>Data</b> – Understand the concept of information being held electronically including the concepts of a ‘variable’, ‘big data’ and ‘images as data’					
<b>Data Y1</b> Understands that images, videos, texts and sounds can all be stored on computers and they are called ‘Data’ and some of this is ‘personal information or data’					
<b>Data Y2</b> They can make informed choices about how to capture information, where to store it and how to retrieve it. For example they may want an image stored online so they can show their parents when they get home.					
<b>Data Y3</b> Understands that software is designed for different purposes and to hold different types of data. They can apply this understanding by choosing the right software and explaining how it matches their intended purpose.					
<b>Data Y4</b> When using ICT for extended work they can plan out the software and data they need. Typically they may collect survey data, manipulate it and present it or use a data logger, web search and databases. It is clear they have an end point in mind and are fluidly using the right ICT to match their intended outcome.					
<b>Data Y5</b> Understands the concept of multiple filters and can apply to websites, databases and spreadsheet tables to successfully narrow down their searching. They apply the same understanding to the idea of a ‘hashtag’					
<b>Data Y6</b> Understands audience and can use a variety of ICT to effectively communicate an idea that is factually accurate and creatively presented offering hyperlinks and further reading to verify their information.					

Objective: <b>UNDERSTANDING</b>	Date Assessed:	Limited Understanding	Able to mimic this with help	Off the gap list! Can explain and apply this	Can reason with this and use it in any context
<b>The Internet</b> – Understanding how most computers are linked together through the internet. Why this is both powerful and dangerous.					
<b>Internet Y1</b> Understands the need to check what and who they find on the internet. Anyone can put anything on for all to see so some things are unkind or wrong.					
<b>Internet Y2</b> Understand why there are millions of results when the search for a word on the internet and can use this to think up how to do better searches.					
<b>Internet Y3</b> Understands why passwords are so essential, the idea of private data and people owning information on the internet. E.g. could explain why a password has so many characters and can't be shared with even friends or even secure information can leak through 'hacking'.					
<b>Internet Y4</b> Understands the concept of fake news and why any searching they do needs to look at lots of websites. They understand the ways of reporting bad sites but understand why some still get through. In searches they may want to check who owns the site etc. They can evaluate sites for others and ask good questions.					
<b>Internet Y5</b> Understands the concept of the 'internet of things' and can explain the purpose of a range of devices that are connected to the internet and ones that are not. Can apply this knowledge to new solutions and stories.					
<b>Internet Y6</b> Understands the concept of an 'echo chamber' and how search engines and advertisers 'learn' what results to give you. Understands the benefits and risks of such algorithms and can imagine good and bad examples.					

	Computing Progression of Practical Skills (Software)			Multi media	E-Safety
	Programming and Control Control	Data, Spreadsheets and databases	Search engines and internet		
KS1	<ul style="list-style-type: none"> <li>• I can describe what actions I will need to do to make something happen in order</li> <li>• I can begin to predict what will happen for a short sequence of instructions.</li> <li>• I can use software/apps to create movement and patterns on a screen.</li> <li>• I can use the word debug correctly.</li> <li>• program and tell you what will happen.</li> <li>• I can watch a program execute and spot where it goes wrong so that I can debug it.</li> <li>• Make a robot move</li> <li>• I can make choices about the buttons and icons I press, touch or click on.</li> <li>• I can give instructions to my friend and follow their instructions to move around.</li> <li>• I can press the buttons in the correct order to make my robot do what I want.</li> <li>• I can program a robot or software to do a particular task.</li> <li>• I can give instructions to my friend (using forward, backward and turn) and physically follow their instructions.</li> <li>• I can use programming software to make objects move.</li> </ul>	<ul style="list-style-type: none"> <li>• I can tell you about different kinds of information such as pictures, video, text and sound.</li> <li>• I can talk about the different ways in which information can be shown.</li> <li>• I can use technology to collect information, including photos, video and sound.</li> <li>• I can sort different kinds of information and present it to others.</li> <li>• I can add information to a pictograph and talk to you about what I have found out.</li> <li>• I talk about the different ways I use technology to collect information, including a camera, microscope or sound recorder.</li> <li>• I can make and save a chart or graph using the data I collect.</li> <li>• I can talk about the data that is shown in my chart or graph.</li> <li>• I am starting to understand a branching database.</li> <li>• I can tell you what kind of information I could use to help me investigate a question.</li> </ul>	<ul style="list-style-type: none"> <li>• I can operate simple equipment.</li> <li>• I can use a safe part of the Internet to play and learn.</li> <li>• I can recognise the ways we use technology in our classroom.</li> <li>• I can recognise ways that technology is used in my home and community.</li> <li>• I can use links to websites to find information.</li> <li>• I can begin to identify some of the benefits of using technology.</li> <li>• I can tell you why I use technology in the classroom.</li> <li>• I can tell you why I use technology in my home and community.</li> <li>• I can identify benefits of using technology including finding information, creating and communicating.</li> <li>• I can talk about the differences between the Internet and things in the physical world.</li> </ul>	<ul style="list-style-type: none"> <li>• I can move objects on a screen.</li> <li>• I can create shapes and text on a screen.</li> <li>• I can use technology to show my learning.</li> <li>• I can be creative with different technology tools.</li> <li>• I can use technology to create and present my ideas.</li> <li>• I can use the keyboard or a word bank on my device to enter text.</li> <li>• I can save information in a special place and retrieve it again.</li> <li>• I can use technology to organise and present my ideas in different ways.</li> <li>• I can use the keyboard on my device to add, delete and space text for others to read.</li> <li>• I can tell you about an online tool that will help me to share my ideas with other people.</li> <li>• I can save and open files on the device I use.</li> </ul>	<ul style="list-style-type: none"> <li>• I can ask an adult when I want to use the Internet.</li> <li>• I can tell an adult when something worrying or unexpected happens while I am using the Internet.</li> <li>• I am careful with technology devices.</li> <li>• I can keep my password private.</li> <li>• I can tell you what personal information is.</li> <li>• I can recognise an age appropriate website.</li> <li>• I can agree and follow sensible e-Safety rules.</li> <li>• I can describe the things that happen online that I must tell an adult about.</li> <li>• I can talk about why I should go online for a short amount of time.</li> <li>• I can talk about why it is important to be kind and polite online and in real life.</li> <li>• I know that not everyone is who they say they are on the Internet.</li> </ul>
Needs Practice (NP)					
Mastered (M)					

Lower KS2	<ul style="list-style-type: none"> <li>• I can break an open-ended problem up into smaller parts.</li> <li>• I can put programming commands into a sequence to achieve a specific outcome.</li> <li>• I keep testing my program and can recognise when I need to debug it.</li> <li>• I can use repeat commands.</li> <li>• I can describe the algorithm I will need for a simple task.</li> <li>• I can use logical thinking to solve an open-ended problem by breaking it up into smaller parts.</li> <li>• I can use an efficient procedure to simplify a program.</li> <li>• I can use a sensor to detect a change which can select an action within my program.</li> <li>• I know that I need to keep testing my program while I am putting it together.</li> <li>• I can use a variety of tools to create a program.</li> <li>• I can recognise an error in a program and debug it.</li> <li>• I recognise that an algorithm will help me to sequence more complex programs including in other learning such as Maths, Science and Design and Technology.</li> </ul>	<ul style="list-style-type: none"> <li>• I can talk about the different ways data can be organised.</li> <li>• I can search a ready-made database to answer questions.</li> <li>• I can collect data help me answer a question.</li> <li>• I can add to a database.</li> <li>• I can make a branching database.</li> <li>• I can use a data logger to monitor changes and can talk about the information collected.</li> <li>• I can organise data in different ways.</li> <li>• I can collect data and identify where it could be inaccurate.</li> <li>• I can plan, create and search a database to answer questions.</li> <li>• I can choose the best way to present data to my friends.</li> </ul>	<ul style="list-style-type: none"> <li>• I can save and retrieve work on the Internet, the school network or my own device.</li> <li>• I can talk about the parts of a computer.</li> <li>• I can tell you ways to communicate online.</li> <li>• I can describe the World Wide Web as the part of the Internet that contains websites.</li> <li>• I can use search tools to find appropriate websites</li> <li>• I can tell you whether a resource I am using is on the Internet, school network or my device.</li> <li>• I can identify key words to use when searching safely on the World Wide Web.</li> <li>• I think about the reliability of information I read on the World Wide Web.</li> <li>• I can tell you how to check who owns photos, text and clipart.</li> <li>• I can create a hyperlink to a resource on the World Wide Web.</li> </ul>	<ul style="list-style-type: none"> <li>• I can create different effects with different technology tools.</li> <li>• I can combine a mixture of text, graphics and sound to share my ideas and learning.</li> <li>• I can share work online using appropriate tools.</li> <li>• I can use photos, video and sound to create an atmosphere for different audiences.</li> <li>• I am confident to explore new media to extend what I can achieve.</li> <li>• I can change the appearance of text to increase effectiveness.</li> <li>• I can create, modify and present documents for a particular purpose.</li> <li>• I can use a keyboard and a spellchecker to write and review my work.</li> <li>• I can give constructive feedback to my friends to help them improve their work and refine my own work.</li> </ul>	<ul style="list-style-type: none"> <li>• I can talk about what makes a secure password and why they are important.</li> <li>• I choose age appropriate websites and games.</li> <li>• I make good choices about how long I spend online.</li> <li>• I ask an adult before downloading files and games.</li> <li>• I can post positive comments online.</li> <li>• I choose a secure password when I am using a website.</li> <li>• I can talk about the ways I can protect myself and my friends from harm online.</li> <li>• I use the safety features of websites as well as reporting concerns to an adult.</li> <li>• I know that anything I post online can be seen by others.</li> <li>• I can help my friends make good choices about the time they spend online.</li> <li>• I can talk about why I need to ask a trusted adult before downloading files and games from the Internet.</li> <li>• I comment positively and respectfully online.</li> </ul>
NP					
M					

Upper KS2	<ul style="list-style-type: none"> <li>• I can decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program.</li> <li>• I can refine a procedure using repeat commands to improve a program.</li> <li>• I can use a variable to increase programming possibilities.</li> <li>• I can change an input to a program to achieve a different output.</li> <li>• I can use 'if' and 'then' commands to select an action.</li> <li>• I can talk about how a computer model can provide information about a physical system.</li> <li>• I use logical thinking, imagination and creativity to extend a program</li> <li>• I can explain and program each of the steps in my algorithm.</li> <li>• I can evaluate the effectiveness and efficiency of my algorithm while I continually test programming it .</li> <li>• I can recognise when I need to use a variable to achieve a required output.</li> <li>• I can use a variable and operators to stop a program.</li> <li>• I can use different inputs (including sensors) to control a device or onscreen action and predict what will happen.</li> <li>• I can use logical reasoning to detect and correct errors in a algorithms and programs.</li> </ul>	<ul style="list-style-type: none"> <li>• I can choose an appropriate tool to help me collect data..</li> <li>• I can present data in an appropriate way.</li> <li>• I can search a database using different operators to refine my search.</li> <li>• I can talk about mistakes in data and suggest how it could be checked.</li> <li>• I can check the data I collect for accuracy and plausibility.</li> <li>• I can interpret the data I collect.</li> <li>• I can present the data I collect in an appropriate way.</li> <li>• I use the skills I have developed to interrogate a database.</li> </ul>	<ul style="list-style-type: none"> <li>• I can describe different parts of the Internet..</li> <li>• I can use a search engine to find appropriate information and check its reliability.</li> <li>• I can recognise and evaluate different types of information I find on the World Wide Web.</li> <li>• I can describe the different parts of a webpage.</li> <li>• I can find out who the information on a webpage belongs to.</li> <li>• I can tell you the Internet services I need to use for different purposes.</li> <li>• I can describe how information is transported on the Internet.</li> <li>• I can select an appropriate tool to communicate and collaborate online.</li> <li>• I can talk about the way search results are selected and ranked.</li> <li>• I can check the reliability of a website.</li> <li>• I can tell you about copyright and acknowledge the sources of information that I find online</li> </ul>	<ul style="list-style-type: none"> <li>• I can use text, photo, sound and video editing tools to refine my work.</li> <li>• I can use the skills I have already developed to create content using unfamiliar technology.</li> <li>• I can select, use and combine appropriate tools to create effects that will have an impact on others online.</li> <li>• I select appropriate online or offline tools to create and share ideas.</li> <li>• I can review and improve my own work and support others to improve their work.</li> <li>• I can talk about audience, atmosphere and structure when planning an outcome.</li> <li>• I can confidently identify the potential of unfamiliar technology to increase my creativity.</li> <li>• I can tell you why I select a particular online tool for a specific purpose.</li> <li>• I can be digitally discerning when evaluating the effectiveness of my own work and the work of others.</li> </ul>	<ul style="list-style-type: none"> <li>• I protect my password and other personal information.</li> <li>• I can explain why I need to protect myself and my friends and the best ways to do this, including reporting concerns to an adult.</li> <li>• I know that anything I post online can be seen, used and may affect others.</li> <li>• I can talk about the dangers of spending too long online or playing a game.</li> <li>• I can explain the importance of being kind and respectful.</li> <li>• I can discuss the importance of choosing an age-appropriate website or game.</li> <li>• I know which resources I can download and use.</li> <li>• I protect my password and other personal information.</li> <li>• I can explain the consequences of sharing too much about myself online.</li> <li>• I support friends to protect themselves and make good choices online, inc. reporting concerns to an adult.</li> <li>• I can explain consequences of spending too much time online or on a game.</li> <li>• I protect my computer or device from internet harm.</li> </ul>
NP					
M					

## Enabling Knowledge

- **Algorithm** – an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective.
- **Computer networks** – the computers and the connecting hardware (wifi access points, cables, fibres, switches and routers) that make it possible to transfer data using an agreed method ('protocol').
- **Control** – using computers to move or otherwise change 'physical' systems. The computer can be hidden inside the system or connected to it.
- **Data** – a structured set of numbers, representing digitised text, images, sound or video, which can be processed or transmitted by a computer.
- **Debug** – to detect and correct the errors in a computer program.
- **Digital content** – any media created, edited or viewed on a computer, such as text (including the hypertext of a web page), images, sound, video (including animation), or virtual environments, and combinations of these (i.e. multimedia).
- **Information** – the meaning or interpretation given to a set of data by its users, or which results from data being processed.
- **Input** – data provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors.
- **Internet** – the global collection of computer networks and their connections, all using shared protocols (TCP/IP) to communicate.
- **Logical reasoning** – a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules.
- **Output** – the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly through the control of motors in physical systems.
- **Program** – a stored set of instructions encoded in a language understood by the computer that does some form of computation, processing input and/or stored data to generate output.
- **Repetition** – a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.
- **Search** – to identify data that satisfies one or more conditions, such as web pages containing supplied keywords, or files on a computer with certain properties.
- **Selection** – a programming construct in which the instructions that are executed are determined by whether a particular condition is met.
- **Sequence** – to place programming instructions in order, with each executed one after the other.
- **Services** – programs running on computers, typically those connected to the internet, which provide functionality in response to requests; for example, to transmit a web page, deliver an email or allow a text, voice or video conversation.
- **Simulation** – using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical and social systems; an integral part of most computer games.
- **Software** – computer programs, including both application software (such as office programs, web browsers, media editors and games) and the computer operating system. The term also applies to 'apps' running on mobile devices and to webbased services.
- **Variables** – a way in which computer programs can store, retrieve or change simple data, such as a score, the time left, or the user's name.
- **World Wide Web** – a service provided by computers connected to the internet (web servers), in which pages of hypertext (web pages) are transmitted to users; the pages typically include links to other web pages and may be generated by programs automatically.