

## Computer Science Unit Overview Year 7

Computer Science - Year 7 Half Term 1 Collaborating online respectfully				
What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<b>Collaborating online respectfully</b>	<ul style="list-style-type: none"> <li>• Create a memorable and secure password for an account on the school</li> <li>• Remember the rules of the computing room</li> </ul>	<p>This is the first lesson that Year 7 will experience in the computing lab. It is important that they know how to log on, create a secure password, and follow the rules that keep them safe.</p>	<p>From KS2, linked learning students should have the learnt how to:</p> <ul style="list-style-type: none"> <li>• understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration</li> <li>• use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>• select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</li> <li>• use technology safely, respectfully and responsibly;</li> </ul>	<p><a href="http://www.anti-bullyingalliance.org.uk">www.anti-bullyingalliance.org.uk</a>  <a href="http://www.bullying.co.uk/cyberbullying">www.bullying.co.uk/cyberbullying</a>  <a href="http://www.ditchthelabel.org">www.ditchthelabel.org</a>  <a href="http://www.canva.com/colors/color-wheel/">www.canva.com/colors/color-wheel/</a>  <a href="http://www.unsplash.com">www.unsplash.com</a></p>
	<ul style="list-style-type: none"> <li>• Find personal documents and common applications</li> <li>• Recognise a respectful email</li> <li>• Construct an effective email and send it to the correct recipients</li> </ul>	<p>Learners should know the common applications that are available on the school network.</p> <p>Learners should know that email is one tool for online communication. There are lots of ways in which learners can communicate with teachers electronically and learners should be respectful at all times.</p>		
	<ul style="list-style-type: none"> <li>• Describe how to communicate with peers online</li> </ul>	<p>This lesson digs deeper into online communication and shows learners how to make positive contributions to their online community.</p> <p>The key word here is support. The school is a community and we should all be here to look out for each other and support each other. If learners witness anything that makes them feel</p>		

		<p>uncomfortable, then they should report it. Witnesses have an important role to play here. Learners should support and protect their peers by reporting unacceptable behaviour.</p>	<p>recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</p>	
<ul style="list-style-type: none"> <li>• Describe cyberbullying</li> <li>• Explain the effects of cyberbullying</li> <li>• Check who you are talking to online</li> </ul>	<p>Learners will explore specific characteristics of their audience: rather than just saying 'children' or 'teenagers', they should build a character in their minds. This will help them tailor their presentations to the right audience. Learners will explore the effects of cyberbullying and the long-term impacts.</p>			

**Computer Science - Year 7 Half Term 2 Networks: from semaphores to the Internet**

What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<p align="center"><b>Networks: from semaphores to the Internet</b></p>	<ul style="list-style-type: none"> <li>Define what a computer network is and explain how data is transmitted</li> <li>Define 'protocol' and provide examples of non-networking protocols</li> </ul>	<p>This lesson will get the learners thinking about the history of different communication methods. Learners will learn what a computer network is, along with the meaning of the word 'protocol'. Learners will gain an appreciation of the growth of networked devices.</p> <p>Learners will identify different greeting protocols and use a series of protocol commands in a 'climber/belayer' scenario to ensure that the climber ascends safely. Finally, learners will make a connection between non-networking and networking protocols.</p>	<p>From KS2, linked learning students should have the learnt how to:</p> <ul style="list-style-type: none"> <li>understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration</li> </ul>	<p><a href="http://www.bbc.co.uk/bitesize/guides/z36nb9q/revision/2">www.bbc.co.uk/bitesize/guides/z36nb9q/revision/2</a>  <a href="http://www.nibusinessinfo.co.uk/content/benefits-computer-networks">www.nibusinessinfo.co.uk/content/benefits-computer-networks</a>  <a href="http://www.speedtest.net">www.speedtest.net</a>  <a href="http://www.youtube.com/watch?v=Dxcc6ycZ73M">www.youtube.com/watch?v=Dxcc6ycZ73M</a>  <a href="http://www.submarinemap.com">www.submarinemap.com</a>  <a href="http://www.youtube.com/watch?v=ewrBalT_eBM">www.youtube.com/watch?v=ewrBalT_eBM</a>  <a href="http://lifehacks.io/facts-about-the-internet">lifehacks.io/facts-about-the-internet</a>  <a href="http://www.youtube.com/watch?v=ZTM9GA-4nBA">www.youtube.com/watch?v=ZTM9GA-4nBA</a>  <a href="http://seotribunal.com/blog/google-stats-and-facts">seotribunal.com/blog/google-stats-and-facts</a>  <a href="http://www.bbc.co.uk">www.bbc.co.uk</a>  <a href="http://www.lifewire.com/most-common-tlds-internet-domain-extensions-817511">www.lifewire.com/most-common-tlds-internet-domain-extensions-817511</a>  <a href="http://www.yougetsignal.com/tools/network-location">www.yougetsignal.com/tools/network-location</a></p>
	<ul style="list-style-type: none"> <li>List examples of the hardware necessary for connecting devices to networks</li> </ul>	<p>This lesson explores the functionality of key hardware components found in a network. The lesson covers network cables, hubs, servers and routers. Each is explained in turn, and learners then use their knowledge of each component to build a series</p>		

		<p>of increasingly complicated network diagrams.</p>		
	<ul style="list-style-type: none"> <li>• Compare wired to wireless connections and list examples of specific technologies currently used to implement such connections</li> <li>• Define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important</li> </ul>	<p>This lesson explores the different wireless technologies, and how bandwidth varies between these technologies. Learners will discuss the mobile technologies of 3G, 4G, and 5G. Learners will develop an understanding of the term 'bandwidth' and test the performance of their own internet connection. Learners will also develop an appreciation for online activities that are bandwidth-heavy, before moving on to explore the advantages and disadvantages of wired and wireless networks. By the end of the lesson, learners should be able to identify whether a wired or wireless network should be used in a number of given scenarios.</p>		
	<ul style="list-style-type: none"> <li>• Define what the internet is</li> <li>• Explain how data travels between computers across the internet</li> <li>• Describe key words such as 'protocols', 'packets', and 'addressing'</li> </ul>	<p>This lesson explores the internet and its uses. Learners will explain the internet and its history. Learners will gain an appreciation of the vastness of the internet. Learners will explain how messages can be successfully sent from one device to another across the planet in under a second using packets</p>		

		<p>and IP addresses. Learners will develop an understanding of packet structure and packet switching. The term 'protocol' will be revisited, and two particular protocols, TCP and IP, will be explained.</p>		
	<ul style="list-style-type: none"> <li>• Explain the difference between the internet, its services, and the World Wide Web</li> <li>• Describe how services are provided over the internet</li> <li>• List some of these services and the context in which they are used</li> <li>• Explain the term 'connectivity' as the capacity for connected devices ('Internet of Things') to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation)</li> <li>• Describe how internet-connected devices can affect me</li> </ul>	<p>This lesson explores the internet, its services, and the World Wide Web. Learners will understand the difference between the internet and the World Wide Web and how each came about. They will understand that the activity on the internet in a single minute is quite staggering. Learners will also understand that many different services are provided across the internet. Email and Voice over Internet Protocol (VoIP) will be explained. The term 'Internet of Things (IoT)' will be explored. Learners will understand that the internet can be integrated into anything to make it smarter. Learners will discuss the predicted growth of this area and review smart home IoT devices. Learners will discuss the advantages of IoT, as well as the disadvantages, focussing on privacy and security.</p>		

	<ul style="list-style-type: none"> <li>Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together</li> </ul>	<p>This lesson explores the World Wide Web (WWW), the components that are associated with the WWW, and how they work together. First, learners will look at a series of images and identify how they can be grouped into web browsers, web pages, and search engines. Next, the key components of the WWW are explained (browser, server, web pages, and search engines). Learners will develop an understanding of the difference between HTTP and HTTPS protocols. Learners will also gain an understanding of URLs and their structures. Next, learners will discuss the domain name system and the relationship between IP address and domain name, then complete an activity in which they have to identify the 'type' of organisation from a website URL. Learners will identify which websites should use HTTP and which should use HTTPS based on the type of activity that they support.</p>		
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**Computer Science - Year 7 Half Term 3 Gaining support for a cause**

What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<p align="center"><b>Gaining support for a cause</b></p>	<ul style="list-style-type: none"> <li>• Select the most appropriate software to use to complete a task</li> <li>• Identify the key features of a word processor</li> <li>• Apply the key features of a word processor to format a document</li> <li>• Evaluate formatting techniques to understand why we format documents</li> </ul>	<p>Learners will understand that each software application has a different purpose. Next, learners will use word processing software to explore a range of formatting tools, and then they will be given a document to format using these tools.</p>	<p>From KS2, linked learning students should have the learnt how to:</p> <ul style="list-style-type: none"> <li>• use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>• select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</li> </ul>	<ul style="list-style-type: none"> <li>■ <a href="http://www.youtube.com/watch?v=q0VzUigrb_g&amp;feature=emb_logo">www.youtube.com/watch?v=q0VzUigrb_g&amp;feature=emb_logo</a></li> <li>■ <a href="http://creativecommons.org/choose">creativecommons.org/choose</a></li> <li>■ <a href="http://search.creativecommons.org">search.creativecommons.org</a></li> <li>■ <a href="http://foodhero.com/en/blogs/reduce-meat-consumption">foodhero.com/en/blogs/reduce-meat-consumption</a></li> <li>■ <a href="http://www.plasticpollutioncoalition.org">www.plasticpollutioncoalition.org</a></li> <li>■ <a href="http://www.conserve-energy-future.com/various-deforestation-facts.php">www.conserve-energy-future.com/various-deforestation-facts.php</a></li> <li>■ <a href="http://news.sky.com/story/sheep-registered-as-pupils-in-bid-to-save-classes-at-french-alpsprimary-school-11714338">news.sky.com/story/sheep-registered-as-pupils-in-bid-to-save-classes-at-french-alpsprimary-school-11714338</a></li> <li>■ <a href="http://en.wikipedia.org/wiki/Wikipedia:About#Strengths,_weaknesses,_and_article_quality_in_Wikipedia">en.wikipedia.org/wiki/Wikipedia:About#Strengths,_weaknesses,_and_article_quality_in_Wikipedia</a></li> <li>■ <a href="http://computer.howstuffworks.com/internet/basics/wiki1.htm">computer.howstuffworks.com/internet/basics/wiki1.htm</a></li> <li>■ <a href="http://www.livescience.com/7946-wikipedia-accurate.html">www.livescience.com/7946-wikipedia-accurate.html</a></li> <li>■ <a href="http://climate.nasa.gov/evidence">climate.nasa.gov/evidence</a></li> <li>■ <a href="http://www.realclimate.org/index.php/archives/2019/04/first-successful-modelsimulation-of-the-past-3-million-years-of-climate-change">www.realclimate.org/index.php/archives/2019/04/first-successful-modelsimulation-of-the-past-3-million-years-of-climate-change</a></li> </ul>
	<ul style="list-style-type: none"> <li>• Select appropriate images for a given context</li> <li>• Apply appropriate formatting techniques</li> <li>• Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences</li> <li>• Demonstrate the ability to credit the original source of an image</li> </ul>	<p>Learners will build on the document that they formatted last lesson and will add appropriate images to it, applying relevant formatting techniques. Learners will look at a selection of images and discuss which image they think would be appropriate for the given scenarios. Next, learners will be introduced to copyright law, and then they will watch a video about Creative Commons licensing. Learners will allocate the appropriate</p>		

		Creative Commons licence in the given scenarios.		
	<ul style="list-style-type: none"> <li>• Critique digital content for credibility</li> <li>• Apply techniques in order to identify whether or not a source is credible</li> </ul>	Learners will understand that not all information found on the internet is reliable or trustworthy. Learners will look at techniques to use to help determine the credibility of a source, and then apply these skills by writing an article that could be real or fake. Learners will determine whether or not articles are credible.		
	<ul style="list-style-type: none"> <li>• Apply referencing techniques and understand the concept of plagiarism</li> <li>• Evaluate online sources for use in own work</li> </ul>	Building on the concepts covered in the previous two lessons, the learners will be introduced to the concept of plagiarism. Learners will spend time looking at blog posts to evaluate their layout and content, then they will research their own cause and justify the credibility of their sources.		
	<ul style="list-style-type: none"> <li>• Organise the content of the blog based on credible sources</li> </ul>	Learners will create their blog using a software package.		
	<ul style="list-style-type: none"> <li>• Construct a blog using appropriate software</li> <li>• Organise the content of blog based on credible sources</li> <li>• Apply referencing techniques that credit authors appropriately</li> <li>• Design the layout of the content to make it</li> </ul>	Learners will create their blog using a software package.		



	suitable for the audience			
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**Computer Science - Year 7 Half Term 4 Programming I**

What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<p align="center"><b>Scratch Programming I</b></p>	<ul style="list-style-type: none"> <li>• Compare how humans and computers understand instructions (understand and carry out)</li> <li>• Define a sequence as instructions performed in order, with each executed in turn</li> <li>• Predict the outcome of a simple sequence</li> <li>• Modify a sequence</li> </ul>	<p>Learners will understand the precise nature of instructions that computers need to execute. Learners will place blocks of code into the appropriate subroutines so that their program will run correctly.</p>	<p>From KS2, linked learning students should have the learnt how to:</p> <ul style="list-style-type: none"> <li>• design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>• use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>• use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<ul style="list-style-type: none"> <li>■ <a href="http://scratch.mit.edu">scratch.mit.edu</a></li> <li>■ <a href="http://en.wikipedia.org/wiki/Five_Little_Ducks">en.wikipedia.org/wiki/Five_Little_Ducks</a></li> <li>■ <a href="http://en.wikipedia.org/wiki/Software_bug">en.wikipedia.org/wiki/Software_bug</a></li> </ul>
	<ul style="list-style-type: none"> <li>• Define a variable as a name that refers to data being stored by the computer</li> <li>• Recognise that computers follow the control flow of input/process/output</li> <li>• Predict the outcome of a simple sequence that includes variables</li> <li>• Trace the values of variables within a sequence</li> <li>• Make a sequence that includes a variable</li> </ul>	<p>learners will understand variables. Learners will predict, run, investigate, and modify scratch programs using variables. Learners will trace the value of a variable in an algorithm.</p>		
	<ul style="list-style-type: none"> <li>• Define a condition as an expression that will be evaluated as either true or false</li> </ul>	<p>learners will understand selection statements and explain how they can be used to control the flow of a program. Learners will understand expressions that</p>		

	<ul style="list-style-type: none"> <li>• Identify that selection uses conditions to control the flow of a sequence</li> <li>• Identify where selection statements can be used in a program</li> <li>• Modify a program to include selection</li> </ul>	<p>evaluate to 'true' or 'false'. Learners will rearrange code to form a working program using selection.</p>		
	<ul style="list-style-type: none"> <li>• Create conditions that use comparison operators (&gt;,&lt;=)</li> <li>• Create conditions that use logic operators (and/or/not)</li> <li>• Identify where selection statements can be used in a program that include comparison and logical operators</li> <li>•</li> </ul>	<p>Learners will use logical and comparison operators in selection statements. Learners will predict what programs will output given different inputs. Learners must decode selection statements and evaluate to 'true' or 'false'. Learners will then build a 'Brain game' Scratch program by adding new questions to subroutines.</p>		
	<ul style="list-style-type: none"> <li>• Define iteration as a group of instructions that are repeatedly executed</li> <li>• Describe the need for iteration</li> <li>• Identify where count-controlled iteration can be used in a program</li> <li>• Implement count-controlled iteration in a program</li> <li>• Detect and correct errors in a program (debugging)</li> </ul>	<p>Learners will explain the concept of iteration, specifically focused on count-controlled iteration. Learners will spot patterns and repetition in pre-existing programs. Learners will take inefficient programs and add iteration to make it more efficient. Learners will create a Scratch version of the nursery rhyme Ten Green Bottles using count-controlled iteration. Learners will explain the concept of debugging and they will debug a program. Learners will trace the value of the variables to debug programs.</p>		

	<ul style="list-style-type: none"><li>Independently design and apply programming constructs to solve a problem (subroutine, selection, count-controlled iteration, operators, and variables)</li></ul>	The main activity for the lesson will be learners' main summative assessment task where they are required to independently work through tasks to complete a dance move game.		
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**Computer Science - Year 7 Half Term 5 Programming II**

What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<p align="center"><b>Scratch Programming II</b></p>	<ul style="list-style-type: none"> <li>Define a subroutine as a group of instructions that will run when called by the main program or other subroutines</li> <li>Define decomposition as breaking a problem down into smaller, more manageable subproblems</li> <li>Identify how subroutines can be used for decomposition</li> </ul>	<p>Learners will explain subroutines.</p> <p>Learners will create a dance battle game by decomposing dance moves and creating subroutines for each move.</p>	<p>From KS2, linked learning students should have the learnt how to:</p> <ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<ul style="list-style-type: none"> <li><a href="https://scratch.mit.edu">scratch.mit.edu</a></li> <li><a href="https://en.wikipedia.org/wiki/Five_Little_Ducks">en.wikipedia.org/wiki/Five_Little_Ducks</a></li> <li><a href="https://en.wikipedia.org/wiki/Software_bug">en.wikipedia.org/wiki/Software_bug</a></li> </ul>
	<ul style="list-style-type: none"> <li>Identify where condition-controlled iteration can be used in a program</li> <li>Implement condition-controlled iteration in a program</li> </ul>	<p>Learners will explain the concept of condition-controlled loops. Learners will predict, run, investigate, and modify code in order to build condition-controlled loops and a successful program.</p>		
	<ul style="list-style-type: none"> <li>Evaluate which type of iteration is required in a program</li> </ul>	<p>Learners will apply each type of iteration available to them in Scratch. Learners will identify the correct iteration type to use in different scenarios. Learners will implement iteration in their own programs as they start to develop them.</p>		
	<ul style="list-style-type: none"> <li>Define a list as a collection of related elements that</li> </ul>	<p>Learners explain the concept of a list and how data is stored by indexing values. Learners use</p>		

	<p>are referred to by a single name</p> <ul style="list-style-type: none"><li>• Describe the need for lists</li><li>• Decompose a larger problem into smaller subproblems</li><li>• Apply appropriate constructs to solve a problem</li></ul>	<p>their investigative skills to discover the essential tools that Scratch can offer surrounding lists.</p>		
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### Computer Science - Year 7 Half Term 6 Spreadsheets

What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<b>Spreadsheets</b>	<ul style="list-style-type: none"> <li>• Identify columns, rows, cells, and cell references in spreadsheet software</li> <li>• Use formatting techniques in a spreadsheet</li> <li>• Use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /)</li> <li>• Use the autofill tool to replicate cell data</li> </ul>	<p>Learners can explain the concept of spreadsheets and why spreadsheets are useful.</p> <p>Learners can navigate a spreadsheet via its rows and columns, and can use the cell referencing system. Learners can locate and select ranges of cells and change cells' background colour and border properties.</p> <p>learners can enter text into cells of a spreadsheet. Learners will perform calculations on the data using basic formulas and cell references. Learners will apply the autofill tool to duplicate cells and continue a linear pattern. Learners will combine the autofill tool with basic formulas to quickly populate a results column with calculations.</p>	<p>From KS2, linked learning students should have the learnt how to:</p> <ul style="list-style-type: none"> <li>• design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>• use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> <li>• select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information</li> </ul>	
	<ul style="list-style-type: none"> <li>• Explain the difference between data and information</li> <li>• Explain the difference between primary and secondary sources of data</li> <li>• Collect data</li> </ul>	<p>Learners will explain the difference between data and information. Learners will explain the difference between primary and secondary sources of data. Learners will design a</p>		

		survey to collect some data of their own for use.		
	<ul style="list-style-type: none"> <li>• Create appropriate charts in a spreadsheet</li> <li>• Use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet</li> </ul>	learners will apply functions to analyse data in a spreadsheet. Learners will create charts from data. Learners will apply four functions: SUM, MAX, MIN, and COUNTA.		
	<ul style="list-style-type: none"> <li>• Analyse data</li> <li>• Use a spreadsheet to sort and filter data</li> <li>• Use the functions AVERAGE, COUNTIF, and IF in a spreadsheet</li> <li>•</li> </ul>	Learners will apply 3 additional functions: COUNTIF, AVERAGE, and IF. Learners will use these functions to sort and filter a spreadsheet. Learners will work on a larger data set to be familiar with using large sets of data. Learners will analyse real-world data using spreadsheets.		
	<ul style="list-style-type: none"> <li>• Use conditional formatting in a spreadsheet</li> <li>• Apply all of the spreadsheet skills covered in this unit</li> </ul>	Learners will apply conditional formatting using rules the learners themselves set.		