COMPUTER SCIENCE - PROGRAMMING				
KEY AREA	YEAR 3	Year 4	Year 5	Year 6
Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems	• Create a sequence of commands using a block language to produce a given outcome • Debug errors to accomplish specific goal	• Plan a program using a block language which includes appropriate loops to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal	• Plan a program which includes selection to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal	• Plan a program which includes variables to produce a given outcome • Debug errors in increasingly complex programs to accomplish specific goal
Solve problems by decomposing them into smaller parts	• Work with others to decompose a problem into smaller steps in planning a project	• Independently decompose a problem into smaller steps in planning a project	• Plan a solution to a problem using decomposition	• Solve problems using decomposition, tackling each part separately
Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	• Explain the order (sequence) of commands can affect the outcome (same commands, different order -> same or different outcome) • Identify different sequences can achieve the same outcome	• Identify patterns (repetition) in a sequence • Understand repetition in programming is also called looping • Identify a loop in a program • Understand, identify and justify when to use 'infinite' or 'count - controlled' loops • Explain the importance in instruction order in a loop	• Define that conditional statements (selection) are used in computer programs • Explain a loop can stop when a condition is met (number of times or event) • Explain a that program flow can branch according to a condition • Use a condition in an if…then… statement to produce a given outcome	• Define 'variable' as something that is changeable • Explain that a variable has a name and a value • Identify a variable in an existing program • Use a variable in a conditional statement to control the flow of a program

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	• Explain simple, sequence - based algorithm independently • Use logical reasoning to detect errors in programs	• Explain an algorithm using sequence and repetition independently • Use logical reasoning to detect and correct errors in programs	• Explain an algorithm using sequence, repetition and selection independently • Use logical reasoning to detect errors in increasingly complex programs	• Clearly and concisely explain algorithms using sequence, repetition, selection and variables independently • Use logical reasoning to detect errors in increasingly complex programs
COMPUTER SCIENCE – UNDESTANDING COMPUTER SYSTEMS AND NETWORKS				
Understand computer networks including the internet	**What is a computer?** • *Understand that a computer takes input, stores information, processes information and outputs the results* • *Know examples of devices that use computers along with how and why they are used* • *Know examples of inputs and outputs*	**What is inside a computer?** • *Know the difference between hardware and software* *Know that a computer has a CPU* • *Know that a computer has RAM and more permanent storage* • *Know the difference between wired, wireless and mobile networks.* • *Know that computers have different operating systems e.g. Windows, iOS, Android*	**What is a computer network?** • *Define what a computer network is* • *Know the names of some hardware e.g. hubs, routers and switches.* • *Consider reasons why we want computers to be connected* • *Know some ways in which our intranet is protected and monitored.*	**What is the Internet?** **How is information sent over the internet?** • *Understand that the internet is a system of cables, fibres, switches, routers and other technologies that connects computers and networks to each other.* • *Understand how packets of data are sent* • *Know what IP addresses are and why they are needed* • *Know the acronym ISP*
Understand multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration	**What is a search engine used for?** **How do we use computers to communicate?** • *Navigate the web and carry out simple web searches to collect digital content.* • *Know the basic layout of a search results page and how to use to aid research*	**What is the world wide web?** **How can a search engine be used more effectively?** • *Understand the difference between the internet and internet services e.g. world wide web and email.* • *Know the acronym www* • *Understand the www is a database.*	**How do search engines work? Can information on the web be trusted?** • *Know that different search engines provide different results* • *Begin to know how 'web crawler programs' (spiders) help organise how search results are displayed.*	**What are the positives and negatives of technology?** • *Debate the pros and cons of internet services* • *Consider advances in technology*

	• *Demonstrate use of computers safely and responsibly, knowing of ways to report inappropriate content.*	• *Know the acronym URL (also known as a web address)* • *Know how to choose reputable/known websites* • *Know how to filter images in a search engine* • *Recognise what is acceptable and unacceptable behaviour when using technology and online services.*	• *Compare information on different websites about a given subject making judgements on their reliability.* • *Demonstrate responsible use of technology and online services.* *NB Project Evolve – Managing Information has useful resources to support this.*	

INFORMATION TECHNOLOGY – TEXT AND IMAGES (Google Docs and Slides)				
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	• *Know how to capitalize.* • *Understand that symbols on the top of a key can be accessed by holding down shift* • *Know how to format text to change font, colour, size, underline, bold and italicize.* • *Insert images and format them by resizing and repositioning (wrap text in Docs)* • *Insert shapes and format them.* • *Insert text boxes and format them* • *Copy and paste text, shapes and images including using shortcuts.* • *Check spelling and grammar* • *Change the view by zooming in and out* ***ADDITIONAL FOR GOOGLE SLIDES***	• *Know the different between backspace and delete and how to Alt +Backspace keys to work as delete on a Chromebook* • *Align text left, right, centre and justify and know when these are used* • *Build a list by using a bullet or numbered points* • *Use the highlighting tool* • *Move a word or sentence by highlighting the text and dragging it to a new position* • *Change page layout from portrait to landscape and vice versa* • *Change the order of images and text boxes (layering)* ***ADDITIONAL FOR GOOGLE SLIDES*** • *Change transitions* • *Add animations* • *Use themes*	• Create, adjust and use a table in a Google Docs. • Create an interactive document using hyperlinks. • Make greater use of keyboard shortcuts • Change the spacing between lines • Insert charts editing them with Google Sheets • Add footnotes and headers • Insert symbols and special characters (including using the drawing feature) • Recognise an image is comprised of separate objects • Add, remove, modify and combine objects to create graphical drawing on a computer	*Children should be independently making use of skills from previous year groups making considerations about the effect and overall appearance for the reader.* • Create 3D graphical objects on a computer • Alter the view of a 3D space • Modify 3D objects • Combine 3D objects to create desired effect • Apply blank 3D objects as placeholders to create holes

			• Recognise objects are layered • Recognise that objects can be modified in groups • Consider the impact of choices made ***ADDITIONAL FOR GOOGLE SLIDES*** • Make use of guides and 'snap to' features to enhance the overall presentation of each slide • Add videos to presentations • Insert and edit diagrams • Add speaker notes to aid presentations. • Creating more 'professional looking' presentations with a consistent theme (font/background/transitions/animations)	
• Change the background				

INFORMATION TECHNOLOGY – MULTIMEDIA (photos, audio, videos, animations, music)				
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	**ANIMATIONS** • Understand animation is a sequence of drawings or photographs • Relate animated movement with a sequence of images • Plan an animation • Review and improve an animation • Evaluate the impact of adding other media to an animation **AUDIO**	**PHOTOS** • Use a computer to (further) manipulate images • Recognise images can be changed for different purposes • Use the most appropriate tool for a particular purpose • Consider the impact of changes made on the quality of the image	**VIDEO** • Identify the features of a good video • Plan a video production using a story board • Use a computer to make a video • Recognise a video can be improved through editing • Consider the impact of changes made on the quality of the video	Use cross -curricular opportunities to consolidate previous learning from Year 3 – Year 5

	• Press/tap buttons to start and stop recordings • Recognise recorded audio is stored as a file • Edit and alter recorded audio • Layer sounds • Save/export an audio file • Consider the results of editing choices made			
INFORMATION TECHNOLOGY – DATA HANDLING				
Collecting, analysing, evaluating and presenting data and information	• Identify object attributes needed to collect relevant data • Create a branching database • Identify objects using a branching database • Compare information shown in a pictogram with a branching database • Explain that data can be used to answer questions	• Collect data using a digital device • Recognise that a sensor can be used as an input device for data collection • Use a larger data set to find information • Use a computer program to sort data by one attribute • Export information and present data in a table and a graph	• Use a form to collect information • Navigate a flat -file database • Apply knowledge of a database to ask and answer real -world questions • Design a structure for a flat -file database • Choose tools to select and analyse data to answer questions • Select an appropriate graph to visually compare data • Choose suitable ways to present information	• Identify questions that can be answered using data • Create a spreadsheet for a purpose • Apply a formula that can be used to produce calculated data • Recognise data can be calculated using different operations • Evaluate results in comparison to the question asked • Choose suitable ways to presents data
DIGITAL LITERACY - GENERAL				

- [Understand computer networks including the internet; how they can provide multiple services, such as the world-wide web;] **and the opportunities they offer for**	Digital Literacy can be defined as
	    having the skills and knowledge required to be an effective, safe, and discerning user of a range of computer systems.
	    (Taken from Teach Computing report 'Digital Literacy Within the Computing Curriculum' – January 2021)
	
	It includes children being able to use a range of physical devices and software. For AYJS, this includes being able to navigate around their Google accounts including their Google Classrooms. Much of this is developed through the teaching of the Computer Science and Information Technology skills and knowledge.			

communication and collaboration	Teach Computing has identified themes of Digital Literacy within the National Curriculum
- [Use search technologies effectively, appreciate how results are selected and ranked,] **and be discerning in evaluating digital content**	- the use of devices, tools, and applications
	- handling and storing information
- **Use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour**	- design, creation, and editing of content
	- communication
Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	- safety
	- moral and ethical behaviour

	DIGITAL LITERACY – ONLINE SAFETY			

Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	• *Safe web searches*
	 • *Digital footprint*
	 • *SMART Crew code and video clips*
		• *Reminder of safe web searches*
		 • *Digital footprint reminder*
		 • *Age restrictions*
		 • *Communicating online*
		    - *Cyberbullying*
		    - *Being a responsible citizen*
		    - *Appropriate messages*
			• *Reminder of safe web searches*
			 • *Digital footprint reminder*
			 • *CEOP Jigsaw video*
			 • *Recap Y4 learning about communication online*
			 • *Social media age restrictions*
				• *Reminder of safe web searches*
				 • *Digital footprint reminder*
				 • *Reminder of social media age restrictions*
				 • *Be Internet Legends scheme and Interland web game*
				    - *Be Internet Sharp*
				      • *avoiding oversharing*
				    - *Be Internet Alert*

		- Emailing inc. scam emails
		• *Think you know website game aged 8-10*
				• *Phishing*
				- *BE Internet Secure*
				  • *passwords*
				  • *privacy settings*
				- *Be Internet Kind*
				  • *Cyberbullying*
				  • *mixed messages/emojis for clarification*

DIGITAL LITERACY – ONLINE SAFETY (PROJECT EVOLVE)				
Self-image and Identity Shaping online identities and how media impacts on gender and stereotypes	• I can explain what is meant by the term 'identity'. • I can explain how people can represent themselves in different ways online. • I can explain ways in which someone might change their identity depending on what they are doing online (e.g. gaming; using an avatar; social media) and why.	• I can explain how my online identity can be different to my offline identity. • I can describe positive ways for someone to interact with others online and understand how this will positively impact on how others perceive them. • I can explain that others online can pretend to be someone else, including my friends, and can suggest reasons why they might do this.	• I can explain how identity online can be copied, modified or altered. • I can demonstrate how to make responsible choices about having an online identity, depending on context.	• I can identify and critically evaluate online content relating to gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online. • I can describe issues online that could make anyone feel sad, worried, uncomfortable or frightened. I know and can give examples of how to get help, both on and offline. • I can explain the importance of asking until I get the help needed.
Online Relationships Relationships and behaviours that may lead to harm and how positive online interaction can empower and amplify voice.	• I can describe ways people who have similar likes and interests can get together online. • I can explain what it means to 'know someone' online and why this might be different	• I can describe strategies for safe and fun experiences in a range of online social environments (e.g. livestreaming, gaming platforms).	• I can give examples of technology-specific forms of communication (e.g. emojis, memes and GIFs). • I can explain that there are some people I communicate with online who may want to	• I can explain how sharing something online may have an impact either positively or negatively. • I can describe how to be kind and show respect for others online including the importance

	from knowing someone offline. • I can explain what is meant by 'trusting someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online including what information and content they are trusted with. • I can explain why someone may change their mind about trusting anyone with something if they feel nervous, uncomfortable or worried. • I can explain how someone's feelings can be hurt by what is said or written online. • I can explain the importance of giving and gaining permission before sharing things online; how the principles of sharing online is the same as sharing offline e.g. sharing images and videos.	• I can give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours. • I can explain how content shared online may feel unimportant to one person but may be important to other people's thoughts feelings and beliefs.	do me or my friends harm. I can recognise that this is not my / our fault. • I can describe some of the ways people may be involved in online communities and describe how they might collaborate constructively with others and make positive contributions. (e.g. gaming communities or social media groups). • I can explain how someone can get help if they are having problems and identify when to tell a trusted adult. • I can demonstrate how to support others (including those who are having difficulties) online.	of respecting boundaries regarding what is shared about them online and how to support them if others do not. • I can describe how things shared privately online can have unintended consequences for others. e.g. screen-grabs. • I can explain that taking or sharing inappropriate images of someone (e.g. embarrassing images), even if they say it is okay, may have an impact for the sharer and others; and who can help if someone is worried about this.
Online Reputation Strategies to manage personal digital content effectively and capitalise on technology's capacity to create effective positive profiles	• I can explain how to search for information about others online. • I can give examples of what anyone may or may not be willing to share about themselves online. I can explain the need to be careful	• I can describe how to find out information about others by searching online. • I can explain ways that some of the information about anyone online could have been created, copied or shared by others.	• I can search for information about an individual online and summarise the information found. • I can describe ways that information about anyone online can be used by others to make judgements about an	• I can explain the ways in which anyone can develop a positive online reputation. • I can explain strategies anyone can use to protect their 'digital personality' and online reputation, including degrees of anonymity.

	before sharing anything personal. • I can explain who someone can ask if they are unsure about putting something online.		individual and why these may be incorrect	
Online Bullying Strategies for effective reporting and intervention and how bullying and other aggressive behaviour relates to legislation	• I can describe appropriate ways to behave towards other people online and why this is important. • I can give examples of how bullying behaviour could appear online and how someone can get support.	• I can recognise when someone is upset, hurt or angry online. • I can describe ways people can be bullied through a range of media (e.g. image, video, text, chat). • I can explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation).	• I can recognise online bullying can be different to bullying in the physical world and can describe some of those differences. • I can describe how what one person perceives as playful joking and teasing (including 'banter') might be experienced by others as bullying. • I can explain how anyone can get help if they are being bullied online and identify when to tell a trusted adult. • I can identify a range of ways to report concerns and access support both in school and at home about online bullying. I can explain how to block abusive users. I can describe the helpline services which can help people experiencing bullying, and how to access them (e.g. Childline or The Mix).	• I can describe how to capture bullying content as evidence (e.g screen-grab, URL, profile) to share with others who can help me. • I can explain how someone would report online bullying in different contexts.
Managing Online Information	• I can demonstrate how to use key phrases in search	• I can analyse information to make a judgement about probable accuracy and I	• I can explain the benefits and limitations of using different types of search technologies	• I can explain how search engines work and how results are selected and ranked.

Strategies for effective searching, critical evaluation and ethical publishing	engines to gather accurate information online. • can explain what autocomplete is and how to choose the best suggestion. • I can explain how the internet can be used to sell and buy things. • I can explain the difference between a 'belief', an 'opinion' and a 'fact. and can give examples of how and where they might be shared online, e.g. in videos, memes, posts, news stories etc. • I can explain that not all opinions shared may be accepted as true or fair by others (e.g. monsters under the bed). • I can describe and demonstrate how we can get help from a trusted adult if we see content that makes us feel sad, uncomfortable, worried or frightened.	understand why it is important to make my own decisions regarding content and that my decisions are respected by others. • I can describe how to search for information within a wide group of technologies and make a judgement about the probable accuracy (e.g. social media, image sites, video sites). • I can describe some of the methods used to encourage people to buy things online (e.g. advertising offers; in-app purchases, pop-ups) and can recognise some of these when they appear online. • I can explain why lots of people sharing the same opinions or beliefs online do not make those opinions or beliefs true. • I can explain that technology can be designed to act like or impersonate living things (e.g. bots) and describe what the benefits and the risks might be. • I can explain what is meant by fake news e.g. why some people will create stories or alter photographs and put	e.g. voice-activation search engine. • I can explain how some technology can limit the information I am presented with. • I can explain what is meant by 'being sceptical'; I can give examples of when and why it is important to be 'sceptical'. • I can evaluate digital content and can explain how to make choices about what is trustworthy e.g. differentiating between adverts and search results. • I can explain key concepts including: information, reviews, fact, opinion, belief, validity, reliability and evidence. • I can identify ways the internet can draw us to information for different agendas, e.g. website notifications, pop-ups, targeted ads. • I can describe ways of identifying when online content has been commercially sponsored or boosted, (e.g. by commercial companies or by vloggers, content creators, influencers).	• I can explain how to use search technologies effectively. • I can describe how some online information can be opinion and can offer examples. • I can explain how and why some people may present 'opinions' as 'facts'; why the popularity of an opinion or the personalities of those promoting it does not necessarily make it true, fair or perhaps even legal. • I can define the terms 'influence', 'manipulation' and 'persuasion' and explain how someone might encounter these online (e.g. advertising and 'ad targeting' and targeting for fake news). • I understand the concept of persuasive design and how it can be used to influences peoples' choices. • I can demonstrate how to analyse and evaluate the validity of 'facts' and information and I can explain why using these strategies are important. • I can explain how companies and news providers target people with online news stories they are more likely to engage with and how to recognise this.

		them online to pretend something is true when it isn't.	• I can explain what is meant by the term 'stereotype', how 'stereotypes' are amplified and reinforced online, and why accepting 'stereotypes' may influence how people think about others. • I can describe how fake news may affect someone's emotions and behaviour, and explain why this may be harmful. • I can explain what is meant by a 'hoax'. I can explain why someone would need to think carefully before they share.	• I can describe the difference between online misinformation and dis-information. • I can explain why information that is on a large number of sites may still be inaccurate or untrue. • I can assess how this might happen (e.g. the sharing of misinformation or disinformation). • I can identify, flag and report inappropriate content.
Health. Wellbeing and Lifestyle The impact that technology has on health, well-being and lifestyle including understanding negative behaviours and issues amplified and sustained by online technologies and the strategies for dealing with them.	• I can explain why spending too much time using technology can sometimes have a negative impact on anyone; I can give some examples of both positive and negative activities where it is easy to spend a lot of time engaged. • I can explain why some online activities have age restrictions, why it is important to follow them and know who I can talk to if others pressure me to watch or do something online that makes me feel uncomfortable	• I can explain how using technology can be a distraction from other things, in both a positive and negative way. • I can identify times or situations when someone may need to limit the amount of time they use technology e.g. I can suggest strategies to help with limiting this time.	• I can describe ways technology can affect health and well-being both positively (e.g. mindfulness apps) and negatively. • I can describe some strategies, tips or advice to promote health and wellbeing with regards to technology. • I recognise the benefits and risks of accessing information about health and well-being online and how we should balance this with talking to trusted adults and professionals. • I can explain how and why some apps and games may	• I can describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose. • I recognise and can discuss the pressures that technology can place on someone and how / when they could manage this. • I can recognise features of persuasive design and how they are used to keep users engaged (current and future use). • I can assess and action different strategies to limit the impact of technology on health (e.g. night-shift mode, regular

			request or take payment for additional content (e.g. in-app purchases, lootboxes) and explain the importance of seeking permission from a trusted adult before purchasing.	breaks, correct posture, sleep, diet and exercise).
(e.g. age restricted gaming or web sites).				
Privacy and Security Behavioural and technical strategies to limit impact on privacy and protect data and systems against compromise.	• I can describe simple strategies for creating and keeping passwords private. • I can give reasons why someone should only share information with people they choose to and can trust. I can explain that if they are not sure or feel pressured then they should tell a trusted adult. • I can describe how connected devices can collect and share anyone's information with others.	• I can describe strategies for keeping personal information private, depending on context. • I can explain that internet use is never fully private and is monitored, e.g. adult supervision. • I can describe how some online services may seek consent to store information about me; I know how to respond appropriately and who I can ask if I am not sure. • I know what the digital age of consent is and the impact this has on online services asking for consent.	• I can explain what a strong password is and demonstrate how to create one. • I can explain how many free apps or services may read and share private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others. • can explain what app permissions are and can give some examples.	• I can describe effective ways people can manage passwords (e.g. storing them securely or saving them in the browser). • I can explain what to do if a password is shared, lost or stolen. • I can describe how and why people should keep their software and apps up to date, e.g. auto updates. • I can describe simple ways to increase privacy on apps and services that provide privacy settings. • I can describe ways in which some online content targets people to gain money or information illegally; I can describe strategies to help me identify such content (e.g. scams, phishing). • I know that online services have terms and conditions that govern their use.

Copyright and Ownership Protecting personal content and crediting the rights of others as well as addressing potential consequences of illegal access, download and distribution.	• I can explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause.	• When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. • I can give some simple examples of content which I must not use without permission from the owner, e.g. videos, music, images.	• I can assess and justify when it is acceptable to use the work of others. • I can give examples of content that is permitted to be reused and know how this content can be found online.	• I can demonstrate the use of search tools to find and access online content which can be reused by others. • I can demonstrate how to make references to and acknowledge sources I have used from the internet.