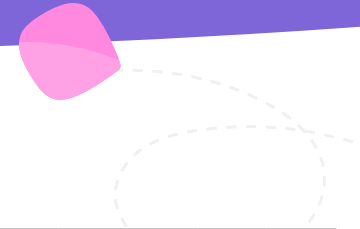# Computer Science and Digital Fluency Learning Standards Grades 4-6

Concept Areas	Clarifying Statement	TypeTastic Keyboarding Curriculum	Cyberbullying	Copyright	Digital Footprint	Reliable Information	Data Connectivity	Digital Citizen's Basic Skills	Selecting Correct Device	Selecting Correct Software	Office Software	Troubleshooting	Digital Progress	Critical Thinking [†]	Data [†]	Data collection tools [†]	Basics of AI [†]	CodeMonkey Coding Curriculum
Impacts of Computing																		
Society																		
4-6.IC.1 Describe computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.	The focus should be on how computing technologies both influence and are influenced by society and culture.												●					
4-6.IC.2 Explain how laws impact the use of computing technologies and digital information.	The focus is on how laws regulate the use of computing technologies and what might happen if those laws did not exist.			●														
Ethics																		
4.6.IC.3 Explain current events that involve computing technologies.	Explanations should be grade level appropriate to ensure understanding of current events and the related computing technologies.																	
4.6.IC.4 Explain who has access to data in different digital spaces.	The focus is on identifying different groups who might have access to data stored or posted in different places, including companies.																	
4.6.IC.5 Explain how computer systems play a role in human decision-making.	The focus is on explaining a range of ways that humans interact with AI to make decisions.																●[†]	
Accessibility																		
4-6.IC.6 Identify and explain ways to improve the accessibility and usability of a computing device or software application for the diverse needs and wants of users.	The focus is on identifying the needs and wants of diverse end users and purposefully considering potential perspectives of users with different backgrounds, ability levels, points of view, and abilities.												●**					

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Career Paths																		
4-6.IC.7 Identify a diverse range of role models in computer science.	The emphasis of this standard is the opportunity to personally identify with a range of diverse people in the field of computer science.																	
Computational Thinking																		
Modeling and Simulation																		
4-6.CT.1 Develop a computational model of a system that shows changes in output when there are changes in inputs.	The emphasis is on understanding, at a conceptual level, that models or simulations can be created to respond to deliberate changes in inputs.																	•*
Data Analysis and Visualization																		
4-6.CT.2 Collect digital data related to a reallife question or need.	The emphasis is on using digital tools to collect and organize multiple data points.															•†		
4-6.CT.3 Visualize a simple data set in order to highlight relationships and persuade an audience.	The emphasis is on identifying and organizing relevant data to emphasize particular parts of the data in support of a claim.															•†		
Abstraction and Decomposition																		
4-6.CT.4 Decompose a problem into smaller named tasks, some of which can themselves be decomposed into smaller steps.	The focus is on identifying smaller steps that solve a larger problem, recognizing that some of those steps must be broken down further until each step is manageable.																	•*
4-6.CT.5 Identify and name a task within a problem that gets performed multiple times while solving that problem, but with slightly different concrete details each time.	The focus is on recognizing that the same general steps are often repeated while solving a problem, even though some of the details may differ.																	•*

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Algorithms And Programming																		
4-6.CT.6 Compare two or more algorithms and discuss the advantages and disadvantages of each for a specific task.	Tasks can be unplugged or related to a computer program and reflect a task with a specific result that can be checked.																	
4-6.CT.7 Identify pieces of information that might change as a program or process runs.	The focus is on identifying information that needs to be updated as a computation progresses.																	•*
4-6.CT.8 Develop algorithms or programs that use repetition and conditionals for creative expression or to solve a problem.	The focus is on having students work with each of conditionals and repetition (loops or iteration), but without having to use them in conjunction with one another.																	•*
4-6.CT.9 Explain each step of an algorithm or program that includes repetition and conditionals for the purposes of debugging.	Debugging frequently involves stepping or tracing through a program as if you were the computer to reveal errors.																	•*
4-6.CT.10 Describe the steps taken and choices made to design and develop a solution using an iterative design process.	An iterative design process involves defining the problem or goal, developing a solution or prototype, testing the solution or prototype, and repeating the process until the problem is solved or desired result is achieved. Describing can include speaking or writing.																	
Networks & System Design																		
Hardware and Software																		
4-6.NSD.1 Propose improvements to the design of a computing technology based on an analysis of user interactions with that technology.	The emphasis is on thinking about how the user interface could be optimized for the purpose of the computing technology and user interactions.																	

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4-6.NSD.2 Model how computer hardware and software work together as a system to accomplish tasks.	A model should only include the basic elements of a computer system, including input, output, processor, and storage.																	
4-6.NSD.3 Determine potential solutions to solve hardware and software problems using common troubleshooting strategies.	The focus is on trying multiple strategies to troubleshoot problems, including rebooting the device, checking for power, checking network availability, closing and reopening an application, try using a different browser, and checking settings within an application.											•						

Networks and the Internet

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4-6.NSD.4 Model how data is structured to transmit through a network.	The focus is on understanding that data is broken down into smaller pieces and labeled to travel through a network and reassembled.																	
4-6.NSD.5 Describe that data can be stored locally or remotely in a network.	The focus is on describing that data must be stored on a physical device. Access to remotely stored data is restricted by the networks, and to access non-local data a connection to the network is required.														•†			

Cybersecurity

Risks

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4-6.CY.1 Explain why different types of information might need to be protected.	The emphasis is on discussing different reasons that adversaries may want to obtain, compromise, or leverage different types of information. At this stage, students should be focused on general concepts.				•													

Safeguards

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4-6.CY.2 Describe common safeguards for protecting personal information.	The emphasis is on describing common safeguards such as protecting devices and accounts with strong passwords, keeping software updated, and not sending sensitive information over SMS.																	

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4-6.CY.3 Describe trade-offs between allowing information to be public and keeping information private and secure.	The focus is on considering the trade-offs of data sharing in different contexts.																	
4-6.CY.4 Model and explain the purpose of simple cryptographic methods.	The focus is on using ciphers to encrypt and decrypt messages as a means of safeguarding data.														•†			
Response																		
4-6.CY.5 Explain suspicious activity of applications and devices.	The emphasis is on describing simple forms of suspicious behavior in common applications and devices, including suspicious data/links, viruses and malware.																	
Digital Literacy																		
Digital Use																		
4-6.DL.1 Type on a keyboard while demonstrating proper keyboarding technique.	The focus is on direct instruction in keyboarding. Instruction should focus on form over speed and accuracy.	•																
4-6.DL.2 Select appropriate digital tools to communicate and collaborate while learning with others.	Students' progress from understanding that people use digital tools to communicate and collaborate to how they use the tools. Communication and collaboration should be purposeful and, when possible and appropriate, with an authentic audience.							•			•							
4-6.DL.3 Conduct and refine advanced multicriteria digital searches to locate content relevant to varied learning goals.	Focus should be on the quality of results a search generates, and how to improve search results based on the task or purpose by defining multiple search criteria and using filters.					•**												
4-6.DL.4 Use a variety of digital tools and resources to create and revise digital artifacts.	The focus is on understanding the editing process when creating digital artifacts on multiple platforms.										•**							
4-6.DL.5 Identify common features of digital technologies.	Many digital technologies have similar features and functionalities. The focus is on identifying the similarities between different programs or applications, such as word processing tools on different platforms.									•	•							

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Digital Citizenship																		
4-6.DL.6 Describe persistence of digital information and explain how actions in online spaces can have consequences.	In order for students to be able to effectively manage their digital identities, it should be understood that online information doesn't "go away," and that information posted online can affect their real lives, even years in the future.				●													
4-6.DL.7 Identify and describe actions in online spaces that could potentially be unsafe or harmful.	The focus is on identifying and describing potentially unsafe behaviors, and actions to take if they are witnessed or experienced, including cyberbullying.		●	●				●										