EES

INNOVATION

EES COMPUTER SCIENCE SCOPE & SEQUENCE
2023 IAS ALIGNMENT GUIDE

Data & Information

Kindergarten - Grade 2			Grades 3 - 5			Grades 6 - 8
Learning Outcome: Students collect, store, visualize, and transform data to make inferences and predictions about the world.			Learning Outcome: Students select aspects and portions of data to be transformed, clustered, and categorized to provide views and insights about the data.			Learning Outcome: Students identify and implement multiple means of representing complex algorithms to communicate how applications store data as a representation understandable by people.
K	K-2.DI.1: Identify and collect data using digital tools (e.g., take pictures of all blue items, create a document with things that start with "a").		3rd	3-5.DI.1: Decompose problems and subproblems into parts as a means to solving complex problems. (E)		6,7,8	6-8.DI.1: Decompose (i.e., break down) problems into smaller, more manageable subsets by applying the algorithmic problem solving steps to make the possible solutions easier to follow, test, and debug. (E)
K	K-2.DI.2: Define stored information as data and when appropriate, copy, search, retrieve, modify, and delete it.		4th	3-5.DI.2: Organize and present collected data visually to highlight relationships and support a claim.		6th, 8th	6-8.DI.2: Collect data using computational tools (e.g., sensors, inputs like microphones) and transform the data to make it more useful and reliable.
2nd	K-2.DI.3: Model that data can be stored and manipulated using numbers or symbols to represent information.		5th	3-5.DI.3: Demonstrate how variables can represent data and are used to store and modify information.		6,7,8	6-8.DI.3: Describe that data can be represented in multiple encoding schemes such as binary, RGB values (e.g., red, green, and blue intensity), and hexadecimal codes.
2nd	K-2.DI.4: Organize and present data in different visual formats such as charts, graphs, and symbols, and identify and describe patterns to make predictions. (E)		4th	3-5.DI.4: Describe that data can be represented in different forms understandable by people, including words, symbols, and digital displays of color.		6th, 8th	6-8.DI.4: Create visuals such as flowcharts, diagrams, and pseudocode to represent complex problems as algorithms. (E)
			3rd	3-5.DI.5: Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea. (E)			

Computing Devices & Systems

Kindergarten - Grade 2			Grades 3 - 5			Grades 6 - 8
Learning Outcome: Students identify a computing system as being composed of hardware and software, troubleshooting common problems and generating solutions based on the needs of the user.			Learning Outcome: Students identify similarities between computing systems to troubleshoot common problems and choose appropriate combinations of hardware and software to accomplish desired tasks.			Learning Outcome: Students explain trade-offs, functionality, and accessibility of computer systems to improve the human-computer interaction.
K	K-2.CD.1: Use appropriate terminology in identifying and describing computer hardware. (E)		3rd	3-5.CD.1: Model how computer hardware and software work together to accomplish tasks.		6th	6-8.CD.1: Design projects that combine hardware and software components to collect and exchange data. (E)
K	K-2.CD.2: Describe and troubleshoot basic hardware and software problems using appropriate terminology.		3rd	3-5.CD.2: Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies. (E)		6th, 7th, 8th	6-8.CD.2: Systematically identify and fix problems (i.e., troubleshoot) with computing devices and their components (e.g., checklist, decision tree, flowchart).
2nd	K-2.CD.3: Select and operate appropriate software to perform a variety of tasks and recognize that users have different needs and preferences for the technology they use.		4th	3-5.CD.3: Describe how internal and external parts of computing devices function to form a system.		6th	6-8.CD.3: Recommend improvements to the design of computing devices based on analysis of how users interact with the devices. (E)
			4th	3-5.CD.4: Describe what distinguishes humans from machines, focusing on human intelligence versus machine intelligence.		6th, 7th, 8th	6-8.CD.4: Describe what distinguishes humans from machines, focusing on ways we can communicate, as well as ways in which computers use models of intelligent behavior (e.g., robot motion, speech and language understanding, computer vision).

Programs & Algorithms

	Kindergarten - Grade 2		Grades 3 - 5		Grades 6 - 8
	Learning Outcome: Students model complex tasks using algorithmic problem solving and develop simple computing programs to represent them.		**Learning Outcome: Students collaboratively engage in computer program development with consideration of documenting design choices and giving appropriate attributions.**		**Learning Outcome: Students collaboratively design meaningful solutions for others by defining a problem, carefully considering the diverse needs and wants of the community, and testing whether solutions fit the criteria defined in the problem.**
K	**K-2.PA.1:** Breakdown and plan the order of the steps needed for a desired outcome to accomplish the goal. (E)	**3rd**	**3-5.PA.1:** Collaborate with peers to implement problem-solving steps to create a variety of programming solutions. (E)	**6th, 7th, 8th**	**6-8.PA.1:** Design and iteratively develop programs that combine the following: sequencing, looping (including nested loops), conditionals (including compound conditionals), expressions, variables, functions, and parameters. (E)
K	**K-2.PA.2:** Using age-appropriate vocabulary, explain steps taken and choices made to improve the design of a sequence.	**4th**	**3-5.PA.2:** Design programs that incorporate sequences, events, loops, and conditionals. (E)	**6th, 7th, 8th**	**6-8.PA.2:** Systematically test and refine programs using a range of test cases. (E)
2nd	**K-2.PA.3:** Develop programs with sequences and simple loops to express ideas or address a problem. (E)	**4th**	**3-5.PA.3:** Test and debug (i.e., identify and fix errors) a program or algorithm to ensure it runs as intended.	**6th, 7th, 8th**	**6-8.PA.3:** Incorporate existing code, media, and libraries into original programs and give attribution.
2nd	**K-2.PA.4:** Identify and fix (debug) errors in sequences and simple loops.	**5th**	**3-5.PA.4:** Observe intellectual property rights and give appropriate attribution when creating or remixing programs. (E)	**6th, 7th, 8th**	**6-8.PA.4:** Document programs in order to make them easier to follow, test, and debug.
1st	**K-2.PA.5:** Model daily processes by creating and following algorithms (i.e., sets of step-by-step instructions) to complete tasks. (E)	**5th**	**3-5.PA.5:** Describe choices made during program development using code comments, presentations, and demonstrations. (E)		
1st	**K-2.PA.6:** Give attribution when using the ideas and creations of others while developing programs.				

Networking & the Internet

	Kindergarten - Grade 2		Grades 3 - 5		Grades 6 - 8
	Learning Outcome: Students explain that information shared over connected computer networks must be protected from unauthorized access.		**Learning Outcome: Students describe how personal information is protected as information is transmitted over computer networks.**		**Learning Outcome: Students explain how information is sent and received securely across different networks and the internet.**
2nd	**K-2.NI.1:** Explain what passwords are, why they are used, and why it is important to develop strong passwords to protect devices and information. (E)	**5th**	**3-5.NI.1:** Discuss real-world cybersecurity problems and how personal information can be protected. (E)	**6th, 7th, 8th**	**6-8.NI.1:** Explain how physical and cybersecurity measures protect electronic information. (E)
		5th	**3-5.NI.2:** Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the internet, and reassembled at the destination.	**6th, 7th, 8th**	**6-8.NI.2:** Model the role of protocols in transmitting data across networks and the internet. (E)
				6th, 7th, 8th	**6-8.NI.3:** Apply multiple methods of encryption to model the secure transmission of information.

Impact & Culture

	Kindergarten - Grade 2		Grades 3 - 5		Grades 6 - 8
	Learning Outcome: Students explain how computing affects the way people live, work, and communicate.		**Learning Outcome: Students describe how local and global collaboration is impacted by computing technology.**		**Learning Outcome: Students explain that society is faced with trade-offs due to the increasing globalization and automation that computing brings, as well as describe these trade-offs using multiple viewpoints from a diverse audience.**

		3rd	3-5.IC.1: Describe the positive and negative impacts of technology on one's personal life, society, and our culture. (E)	6th, 7th, 8th	6-8.IC.1: Exhibit legal and ethical behaviors when using technology and information and discuss the consequences of misuse. (E)
K	K-2.IC.1: Compare and contrast the effects of technology on communities and social interactions.	4th	3-5.IC.2: Seek diverse perspectives for the purpose of improving computational artifacts.	6th, 7th, 8th	6-8.IC.2: Discuss issues of bias and accessibility in the design of existing technologies.
1st	K-2.IC.2: Identify expected behaviors for working responsibly with others online. (E)	5th	3-5.IC.3: Critique computing technologies that have changed the world. Analyze how those technologies influence and/or are influenced by cultural practices and societal biases.	6th, 7th, 8th	6-8.IC.3: Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact.
2nd	K-2.IC.3: Describe how to keep login information private and log off of devices appropriately.			6th, 7th, 8th	6-8.IC.4: Describe tradeoffs between allowing information to be public and keeping information private and secure.
				6th, 7th, 8th	6-8.IC.5: Discuss how unequal distribution and participation in technology and computer science disadvantages marginalized populations.

Key:		Key:		Key:			
Kindergarten- Standard is covered in Kindergarten		3rd- Standard is covered in 3rd grade		6th, 8th- Standard is covered in 6th & 8th grades			
First- Standard is covered in 1st Grade		4th- Standard is covered in 4th grade		6th, 7th, 8th- Standard is covered in 6th, 7th, and 8th grades			
Second- Standard is covered in 2nd Grade		5th- Standard is covered in 5th grade		6th- Standard is covered in 6th grade			