

Concept	Indicator	Indicator Statement	Class Pack Unit	Team Experience
Computing Systems Devices Hardware & Software Troubleshooting <i>Grades 6-12</i>	68-CS-01	Understand the design of computing devices based on an analysis of how users interact with the devices.	6	
	68-CS-02	Design projects that combine hardware and software components to collect and exchange data.	3,4	x
	68-CS-03	Systematically identify and fix problems with computing devices and components.	3,4,5,6,7,8,9,10	x
	ICS-CS-01	Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.	9	
	ICS-CS-02	Compare levels of abstraction and interactions between application software, system software, and hardware layers.	9	
	ICS-CS-03	Explain the roles of operating systems including memory management, data storage/retrieval, process management, and access control	4,9	x
	ICS-CS-04	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.	3,4,5,6,7,8,9,10	x
	HS-CS-01	Describe the use of artificial intelligence within computing systems.	9	x
	HS-CS-02	Explain how computing devices manage and allocate shared resources.	3.4.9	x
	HS-CS-03	Illustrate the ways computing systems implement logic, input, and output through hardware components.	3.4.9	x
	HS-CS-04	Utilize guidelines that convey systematic troubleshooting strategies that debug computer systems.	3,4,5,6,7,8,9,10	x
Networks & The Internet Network Communication & Organization Cybersecurity <i>Grades 6-12</i>	68-NI-01	Analyze different ways that data is transferred across a network and the role of protocols in transmitting data.	3,4,5,6,7,8,9,10	x
	68-NI-02	Explain how physical and digital security measures protect electronic information.	6	
	68-NI-03	Explain permission and authorizations to access resources to computer systems online. property.	6	
	68-NI-04	Apply multiple methods of encryption to model the secure transmission of information.	6	
	ICS-NI-01	Evaluate the relationship between routers, switches, servers, and topology with regard to networks	6	
	ICS-NI-02	Identify examples to illustrate how sensitive data can be affected by malware and other attacks.	6	
	ICS-NI-03	Recommend cybersecurity measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts	6	
	ICS-NI-04	Compare various security measures and consider tradeoffs between the usability and security of a computing system.	6	
	HS-NI-02	Analyze issues of network functionality in computational artifact design	6	
	HS-NI-03	Identify issues of unauthorized access and cybersecurity in computational artifact design.	6	
	HS-NI-04	Analyze issues of unauthorized access and cybersecurity in computational artifact design	6	
HS-NI-05	Explain tradeoffs when selecting and implementing cybersecurity recommendations for various scenarios based on factors such as efficiency, feasibility, and ethical impacts.	6		

Data and Analysis Storage Collection, Visualization & Transformation <i>Grades 6-12</i>	68-DA-01	Represent data using multiple encoding schemes.	3,4,5,6,7,8,9,10	x
	68-DA-02	Collect data using computational tools	3,4,5,6,7,8,9,10	x
	68-DA-03	Transform the collected data to make it more useful and reliable	3,4,5,6,7,8,9,10	x
	68-DA-04	Refine computational models based on the data they have generated and/or data collected.	3,4,5,6,7,8,9,10	x
	ICS-DA-01	Compare different binary representations of data, including text, sound, images, and numbers.	3,4,5,6,7,8,9,10	
	ICS-DA-02	Evaluate the tradeoffs in how data elements are organized and where data is stored.	3,4,5,6,7,8,9,10	
	ICS-DA-03	Create interactive data visualizations using software tools to help others better understand real-world phenomena	3,4,5,6,7,8,9,10	x
	ICS-DA-04	Create computational models that represent the relationships among different elements of data collected.	3,4,5,6,7,8,9,10	x
	HS-DA-01	Identify patterns in data representing complex systems with select data analysis tools and techniques.	3,4,5,6,7,8,9,10	x
	HS-DA-02	Select appropriate data collection tools and techniques	3,4,5,6,7,8,9,10	x
	HS-DA-03	Compile data sets that support a claim or communicate information.	3,4,5,6,7,8,9,10	x
	HS-DA-04	Identify the ability of models and simulations to test hypotheses.	3,4,5,6,7,8,9,10	x
	HS-DA-05	Formulate hypotheses with select models and simulations.	3,4,5,6,7,8,9,10	x
	Algorithms & Programmin g Algorithms Variables Control Modularity Program Development <i>Grades 6-12</i>	68-AP-01	Implement flowcharts and/or pseudocode to address complex problems as algorithms.	3,4,5,6,7,8,9,10
68-AP-02		Create clearly named variables that represent different data types.	3,4,5,6,7,8,9,10	x
68-AP-03		Construct programs that include events.	3,4,5,6,7,8,9,10	x
68-AP-04		Students exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.	1-11	x
68-AP-05		Organize problems and subproblems into parts	1-11	x
68-AP-06		Explain the design, implementation, and review of programs	1-11	x
68-AP-07		Create procedures with parameters to organize code and make it easier to reuse groups of instructions.	3,4,5,6,7,8,9,10	x
68-AP-08		Assess feedback from team members and users to refine a solution that meets user needs	1-11	x
68-AP-09		Incorporate existing code and media into original programs and give attribution.	3,4,9	x
68-AP-10		Systematically test and refine programs using a range of test cases.	3,4,5,6,7,8,9,10	x
68-AP-11		Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts.	3,4,5,6,7,8,9,10	x
68-AP-12		Document programs in order to make them easier to follow, test, and debug.	3,4,5,6,7,8,9,10	x
ICS-AP-01		Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests	3,4,5,6,7,8,9,10	x
ICS-AP-02		Explain the use of artificial intelligence within computing systems.	9	x
ICS-AP-03		Utilize lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.	4,8,9	x
ICS-AP-04		Justify the selection of specific control structures, considering implementation, readability, and program performance.	4-10	x
ICS-AP-05	Iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.	6		

	ICS-AP-06	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects	1-10	
	ICS-AP-07	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.	4,9	
	ICS-AP-08	Systematically design programs for broad audiences.	6	
	ICS-AP-09	Refine programs by incorporating feedback from users	6	
	ICS-AP-10	Evaluate licenses that limit or restrict use of computational artifacts when using resources such as software libraries		
	ICS-AP-11	Evaluate computational artifacts for usability	6	x
	ICS-AP-12	Modify computational artifacts to increase usability and accessibility	6	
	ICS-AP-13	Develop computational artifacts working in team roles using collaborative tools.	2-10	x
	ICS-AP-14	Explain design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.	1-11	x
	HS-AP-01	Identify artificial intelligence algorithms.	9	x
	HS-AP-02	Solve computational problems with classic algorithms.	4,9	x
	HS-AP-03	Evaluate algorithms in terms of their efficiency, correctness, and clarity.	4,5,7,8,9,10	x
	HS-AP-04	Select an appropriate data structure for information of a given problem.	4-10	x
	HS-AP-05	Illustrate the flow of execution of a recursive algorithm.	4,9	x
	HS-AP-06	Identify a large-scale computational problem	6	
	HS-AP-07	Analyze general patterns applicable to a solution.	2,4,9	x
	HS-AP-08	Create computational artifacts with pre-existing procedures, external components, libraries and APIs.	4,5,7,8,9,10	x
	HS-AP-09	Create a computational artifact through an industry-standard process.	6	
	HS-AP-10	Justify that a computational artifact meets design specifications with systematic testing and debugging methods.	4,5,7,8,9,10	x
	HS-AP-11	Construct a computational artifact as a team through industry appropriate collaborative tools and processes	4,5,7,8,9,10	
	HS-AP-12	Compose standard documentation for computational artifacts to make it easier to follow, test, and debug.	4,5,7,8,9,10	x
	HS-AP-13	Modify an existing computational artifact for additional functionality.	4,5,7,8,9,10	x
	HS-AP-14	Discuss intended and unintended implications of a modified computational artifact.	4,5,7,8,9,10	x
	HS-AP-15	Develop computational artifacts for multiple platforms.	6	
	68-IC-01	Compare tradeoffs associated with computing technologies that affect everyday activities and career options	6, 11	
	68-IC-02	Describe how equity, access, and influence impact the distribution of computing resources in a global society	6	
	68-IC-03	Discuss issues of bias and accessibility in the design of existing technologies.	6	
	68-IC-04	Collaborate, model, and promote effective research strategies for assessing and evaluating innovative resources.	1-10	x
	68-IC-05	Collaborate with many contributors to create a computational artifact.	4-10	x

Impacts of Computing Algorithms Variables Control Modularity Program Development <i>Grades 6-12</i>	68-IC-06	Utilize tools and methods for collaboration on a project to increase connectivity of peers	1-11	x
	68-IC-07	Examine the benefits and drawbacks of a digital footprint and online identity	6	
	68-IC-08	Understand how online interactions make an impact on the social, emotional, and physical aspect of others.	6	
	68-IC-09	Compare tradeoffs between allowing information to be public and keeping information private and secure.	6	
	68-IC-10	Explore how laws and regulations impact the development and use of software.	6	
	ICS-IC-01	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.	6	
	ICS-IC-02	Elaborate how computational innovations have and may continue to impact society	6	
	ICS-IC-03	Evaluate how equity, access, and influence impact distribution of computing resources in a global society	6	
	ICS-IC-04	Test computational artifacts to reduce bias and equity deficits.	6	
	ICS-IC-05	Demonstrate ways a given algorithm applies to problems across disciplines.	6	x
	ICS-IC-06	Utilize tools and methods for collaboration on a project to increase connectivity of peers.	1-11	x
	ICS-IC-07	Explain the beneficial and harmful effects that intellectual property laws can have on innovation.	6	
	ICS-IC-08	Explain privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.	6	
	ICS-IC-09	Evaluate the social and economic implications of privacy in the context of safety, law, and ethics	6	
	HS-IC-01	Evaluate computational artifacts for their effects on society	6	
	HS-IC-02	Make computational artifact recommendations for maximized beneficial and minimal harmful effects on society.	6	
	HS-IC-03	Predict how computational innovations that revolutionized aspects of our culture might evolve.	6	
	HS-IC-04	Evaluate how equity, access, and influence impact distribution of computing resources in a global society.	6	
	HS-IC-05	Create computational artifacts to ensure accessibility and reduce computational bias	9	x
	HS-IC-06	Utilize tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.	1-11	x