Cybersecurity - CSTA K-12 Computer Science Standards Level 3A: Grades 9-10

Unit 1

Lessons

1-1	1-2	1-3	Identifer			
		x	3A-IC-27	Impacts of Computing	Social Interactions	
			Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.			
		x	3A-AP-23	Algorithms and Programming	Program Development	
			Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.			
		x	3A-AP-22	Algorithms and Programming	Program Development	
			Design and develop computational artifacts working in team roles using collaborative tools.			
		x	3A-DA-11	Data and Analysis	Collection Visualization & Transformation	
			Create interactive data visualizations using software tools to help others better understand real-world phenomena.			
	x		3A-NI-08	Networks and the Internet	Cybersecurity	
			Explain tradeoffs when selecting and implementing cybersecurity recommendations.			
	x		3A-NI-07	Networks and the Internet	Network Communication & Organization	
			Compare various security measures, considering tradeoffs between the usability and security of a computing system.			
	x	x	3A-DA-10	Data and Analysis	Storage	
			Evaluate the tradeoffs in how data elements are organized and where data is stored.			
	x	x	3A-NI-04	Networks and the Internet	Network Communicotion & Organization	
			Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing			
x	x	x	3A-IC-24	Impacts of Computing	Culture	
			Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.			
x	x	x	3A-NI-06	Networks and the Internet	Cybersecurity	
			Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.			
x	x	x	3A-NI-05	Networks and the Internet	Network Communication & Organization	
			Give examples to illustrate how sensitive data can be affected by malware and other attacks.			

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Unit 2

Lessons

2-1	2-2	2-3	2-4	Identifier		
			x	3A-IC-27	Impacts of Computing	Social Interactions
				Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.		
x	x	x	x	3A-IC-24	Impacts of Computing	Culture
				Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.		
	x			3A-AP-23	Algorithms and Programming	Program Development
				Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.		
	x			3A-AP-22	Algorithms and Programming	Program Development
				Design and develop computational artifacts working in team roles using collaborative tools.		
x		x		3A-DA-12	Data and Analysis	Inference &Models
				Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.		
		x		3A-DA-11	Data and Analysis	Collection Visualization & Transformation
				Create interactive data visualizations using software tools to help others better understand real-world phenomena.		
	x	x		3A-DA-10	Data and Analysis	Storage
				Evaluate the tradeoffs in how data elements are organized and where data is stored.		
x		x		3A-NI-08	Networks and the Internet	Cybersecurity
				Explain tradeoffs when selecting and implementing cybersecurity recommendations.		
x		x		3A-NI-07	Networks and the Internet	Network Communication & Organization
				Compare various security measures, considering tradeoffs between the usability and security of a computing system.		
x	x	x	x	3A-NI-06	Networks and the Internet	Cybersecurity
				Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.		
x	x	x	x	3A-NI-05	Networks and the Internet	Network Communication & Organization
				Give examples to illustrate how sensitive data can be affected by malware and other attacks.		

2-1	2-2	2-3	2-4	Identifier		
x		x	x	3A-NI-04	Networks and the Internet	Network Communicotion & Organization
				Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing		
x	x		x	3A-CS-02	Computing Systems	Hardware & Software
				Compare levels of abstraction and interactions between application software, systemsoftware, and hardware layers.		

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Unit 2

Lessons

2-1	2-2	2-3	2-4	Identifier			
	x			3B-IC-28	Impacts of Computing	Safety Law and Ethics	
				Debate laws and regulations that impact the development and use of software.			
			x	3B-IC-25	Impacts of Computing	Culture	
				Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society.			
	x			3B-AP-22	Algorithms and Programming	Program Development	
				Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality).			
	x			3B-AP-18	Algorithms and Programming	Program Development	
				Explain security issues that might lead to compromised computer programs.			
		x	x	3B-DA-05	Data and Analysis	Collection Visualization and Transformation	
				Use data analysis tools and techniques to identify patterns in data representing complex systems.			
x				3B-NI-04	Networks and the Internet	Cybersecurity	
				Compare ways software developers protect devices and information from unauthorized access.			
x	x	x	x	3B-NI-03	Networks and the Internet	Network Communication and Orhganization	
				Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).			
			x	3B-CS-02	Computing Systems	Troubleshooting	
				Illustrate ways computing systems implement logic, input, and output through hardware components.			
	x	x	x	3B-CS-01	Computing Systems	Hardware & Software	
				Categorize the roles of operating system software.			
	x	x	x	3B-CS-01	Computing Systems	Hardware & Software	
				Categorize the roles of operating system software.			

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Unit 3

Lessons

3-1	3-2	3-3	3-4	Identifer			
			x	3A-IC-27	Impacts of Computing	Social Interactions	
				Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.			
x	x	x	x	3A-IC-24	Impacts of Computing	Culture	
				Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.			
	x		x	3A-AP-23	Algorithms and Programming	Program Development	
				Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.			
			x	3A-AP-22	Algorithms and Programming	Program Development	
				Design and develop computational artifacts working in team roles using collaborative tools.			
x	x	x	x	3A-AP-21	Algorithms and Programming	Program Development	
				Evaluate and refine computational artifacts to make them more usable and accessible.			
x	x		x	3A-DA-12	Data and Analysis	Inference &Models	
				Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.			
			x	3A-DA-11	Data and Analysis	Collection Visualization & Transformation	
				Create interactive data visualizations using software tools to help others better understand real-world phenomena.			
x	x	x	x	3A-DA-10	Data and Analysis	Storage	
				Evaluate the tradeoffs in how data elements are organized and where data is stored.			
			x	3A-NI-08	Networks and the Internet	Cybersecurity	
				Explain tradeoffs when selecting and implementing cybersecurity recommendations.			
			x	3A-NI-07	Networks and the Internet	Network Communication & Organization	
				Compare various security measures, considering tradeoffs between the usability and security of a computing system.			
x	x	x	x	3A-NI-06	Networks and the Internet	Cybersecurity	
				Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.			

3-1	3-2	3-3	3-4	Identifer		
x	x	x	x	3A-NI-05	Networks and the Internet	Network Communication & Organization
				Give examples to illustrate how sensitive data can be affected by malware and other attacks.		
x	x	x	x	3A-NI-04	Networks and the Internet	Network Communicotion & Organization
				Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing		
x	x	x	x	3A-CS-02	Computing Systems	Hardware & Software
				Compare levels of abstraction and interactions between application software, systemsoftware, and hardware layers.		

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Unit 3

Lessons

3-1	3-2	3-3	3-4	Identifer			
	x			3B-IC-28	Impacts of Computing	Safety Law and Ethics	
				Debate laws and regulations that impact the development and use of software.			
x	x	x		3B-IC-25	Impacts of Computing	Culture	
				Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society.			
		x		3B-AP-22	Algorithms and Programming	Program Development	
				Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality).			
		x		3B-AP-18	Algorithms and Programming	Program Development	
				Explain security issues that might lead to compromised computer programs.			
	x	x		3B-AP-15	Algorithms and Programming	Modularity	
				Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.			
		x		3B-AP-10	Algorithms and Programming	Algorithms	
				Use and adapt classic algorithms to solve computational problems.			
	x			3B-DA-06	Data and Analysis	Collection Visualization and Transformation	
				Select data collection tools and techniques to generate data sets that support a claim or communicate information.			
x	x	x	x	3B-DA-05	Data and Analysis	Collection Visualization and Transformation	
				Use data analysis tools and techniques to identify patterns in data representing complex systems.			
		x		3B-NI-04	Networks and the Internet	Cybersecurity	
				Compare ways software developers protect devices and information from unauthorized access.			
x	x	x		3B-NI-03	Networks and the Internet	Network Communication and Orhganization	
				Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).			
x	x	x		3B-CS-02	Computing Systems	Troubleshooting	
				Illustrate ways computing systems implement logic, input, and output through hardware components.			

3-1	3-2	3-3	3-4	Identifer		
x	x	x		3B-CS-01	Computing Systems	Hardware & Software
				Categorize the roles of operating system software.		
x	x	x		3B-CS-01	Computing Systems	Hardware & Software
				Categorize the roles of operating system software.		

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Unit 4

Lessons

4-1	4-2	4-3	Identifer		
		x	3A-DA-12	Data and Analysis	Inference &Models
			Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.		
		x	3A-NI-04	Networks and the Internet	Network Communicotion & Organization
			Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing		
x	x	x	3A-NI-05	Networks and the Internet	Network Communication & Organization
			Give examples to illustrate how sensitive data can be affected by malware and other attacks.		
x	x	x	3A-NI-06	Networks and the Internet	Cybersecurity
			Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.		
		x	3A-NI-07	Networks and the Internet	Network Communication & Organization
			Compare various security measures, considering tradeoffs between the usability and security of a computing system.		
		x	3A-NI-08	Networks and the Internet	Cybersecurity
			Explain tradeoffs when selecting and implementing cybersecurity recommendations.		
x			3A-DA-09	Data and Analysis	Storage
			Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.		
x	x		3A-CS-02	Computing Systems	Hardware & Software
			Compare levels of abstraction and interactions between application software, systemsoftware, and hardware layers.		
		x	3A-DA-11	Data and Analysis	Collection Visualization & Transformation
			Create interactive data visualizations using software tools to help others better understand real-world phenomena.		
		x	3A-IC-27	Impacts of Computing	Social Interactions
			Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.		
x			3A-AP-13	Algorithms and Programming	Algorithms
			Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.		

4-1	4-2	4-3			
x			3A-AP-14	Algorithms and Programming	Variables

Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

| x | x | | 3A-AP-21 | Algorithms and Programming | Program Development |

Evaluate and refine computational artifacts to make them more usable and accessible.

| | x | | 3A-AP-22 | Algorithms and Programming | Program Development |

Design and develop computational artifacts working in team roles using collaborative tools.

| | x | | 3A-AP-23 | Algorithms and Programming | Program Development |

Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.

| x | x | x | 3A-IC-24 | Impacts of Computing | Culture |

Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.

| x | | | 3A-IC-26 | Impacts of Computing | Culture |

Demonstrate ways a given algorithm applies to problems across disciplines.

| | x | | 3A-DA-10 | Data and Analysis | Storage |

Evaluate the tradeoffs in how data elements are organized and where data is stored.

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Unit 4

Lessons

4-1	4-2	4-3	Identifer			
x	x		3B-IC-28	Impacts of Computing	Safety Law and Ethics	
			Debate laws and regulations that impact the development and use of software.			
x	x		3B-IC-25	Impacts of Computing	Culture	
			Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society.			
	x		3B-AP-15	Algorithms and Programming	Modularity	
			Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.			
x	x		3B-DA-06	Data and Analysis	Collection Visualization and Transformation	
			Select data collection tools and techniques to generate data sets that support a claim or communicate information.			
x	x		3B-DA-05	Data and Analysis	Collection Visualization and Transformation	
			Use data analysis tools and techniques to identify patterns in data representing complex systems.			
	x		3B-NI-03	Networks and the Internet	Network Communication and Orhganization	
			Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).			
	x		3B-CS-02	Computing Systems	Troubleshooting	
			Illustrate ways computing systems implement logic, input, and output through hardware components.			
	x		3B-CS-01	Computing Systems	Hardware & Software	
			Categorize the roles of operating system software.			
	x		3B-CS-01	Computing Systems	Hardware & Software	
			Categorize the roles of operating system software.			