9-10 Crosswalk (CSTA Reviewer Debbie Carter)

9–10 Final	Level 3A	9–10 Interim	Level 3A
3A-CS-01	Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.	3A-A-4-9	Demonstrate the value of abstraction for managing problem complexity (e.g., using a list instead of discrete variables).
3A-CS-02	Compare levels of abstraction and interactions between application software, system software, and hardware layers.	3A-A-4-7	Understand the notion of hierarchy and abstraction in high-level languages, translation, instruction sets, and logic circuits.
3A-CS-03	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.	3A-A-6-12	Use a systematic approach and debugging tools to independently debug a program (e.g., setting breakpoints, inspecting variables with a debugger).
3A-NI-04	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing	3A-N-7-30	Describe key protocols and underlying processes of Internet-based services (e.g., http/https and SMTP/IMAP, routing protocols).
		3A-N-4-31	Illustrate the basic components of computer networks (e.g., draw logical and topological diagrams of networks including routers, switches, servers, and end user devices; create model with string and paper).
3A-NI-05	Give examples to illustrate how sensitive data can be affected by malware and other attacks.	3A-N-3-33	Explain the principles of information security (confidentiality, integrity, availability) and authentication techniques

9–10 Final	Level 3A	9–10 Interim	Level 3A
3A-NI-06	Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.	3A-N-6-35	Identify digital and physical strategies to secure networks and discuss the tradeoffs between ease of access and need for security.
3A-NI-07	Compare various security measures, considering tradeoffs between the usability and security of a computing system.	3A-N-1-32	Compare and contrast multiple viewpoints on cybersecurity (e.g., from the perspective of security experts, privacy advocates, the government).
3A-NI-08	Explain tradeoffs when selecting and implementing cybersecurity recommendations	3A-N-3-33	Explain the principles of information security (confidentiality, integrity, availability) and authentication techniques
3A-DA-09	Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.	3A-D-4-18	Convert between binary, decimal, and hexadecimal representations of data (e.g., convert hexadecimal color codes to decimal percentages, ASCII/Unicode representation).
3A-DA-10	Evaluate the tradeoffs in how data elements are organized and where data is stored.	3A-D-4-19	Analyze the representation tradeoffs among various forms of digital information (e.g., lossy versus lossless compression, encrypted vs. unencrypted, various image representations).
		3A-D-3-20	Discuss techniques used to store, process, and retrieve different amounts of information (e.g., files, databases, data warehouses).

9–10 Final	Level 3A	9–10 Interim	Level 3A
3A-DA-11	Create interactive data visualizations using software tools to help others better understand real-world phenomena.	3A-A-3-11	Explain and demonstrate how modeling and simulation can be used to explore natural phenomena (e.g., flocking behaviors, queueing, life cycles).
3A-DA-12	Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.	3A-D-5-17	Create computational models that simulate real-world systems (e.g., ecosystems, epidemics, spread of ideas).
3A-AP-13	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.	3A-D-3-21	Apply basic techniques for locating and collecting small- and large-scale data sets (e.g., creating and distributing user surveys, accessing real-world data sets).
3A-AP-14	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.		New
3A-AP-15	Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made.		New
3A-AP-16	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.	3A-A-5-4	Design, develop, and implement a computing artifact that responds to an event (e.g., robot that responds to a sensor, mobile app that responds to a text message, sprite that responds to a broadcast).

9–10 Final	Level 3A	9–10 Interim	Level 3A
3A-AP-17	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.	3A-A-4-8	Deconstruct a complex problem into simpler parts using predefined constructs (e.g., functions and parameters and/or classes).
3A-AP-18	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.		New
3A-AP-19	Systematically design and develop programs for broad audiences by incorporating feedback from users.	3A-A-2-2	Demonstrate how diverse collaborating impacts the design and development of software products (e.g., discussing real-world examples of products that have been improved through having a diverse design team or reflecting on their own team's development experience).
3A-AP-20	Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries.	3A-A-7-3	Compare and contrast various software licensing schemes (e.g., open source, freeware, commercial).
3A-AP-21	Evaluate and refine computational artifacts to make them more usable and accessible.	3A-A-5-5	Use user-centered research and design techniques (e.g., surveys, interviews) to create software solutions

9–10 Final	Level 3A	9–10 Interim	Level 3A
		3A-C-7-13	Develop and apply criteria (e.g., power consumption, processing speed, storage space, battery life, cost, operating system) for evaluating a computer system for a given purpose (e.g., system specification needed to run a game, web browsing, graphic design or video editing).
3A-AP-22	Design and develop computational artifacts working in team roles using collaborative tools.	3A-A-2-1	Design and develop a software artifact working in a team.
3A-AP-23	Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.		New
3A-IC-24	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.	3A-I-1-26	Compare and debate the positive and negative impacts of computing on behavior and culture (e.g., evolution from hitchhiking to ridesharing apps, online accommodation rental services).
3A-IC-25	Test and refine computational artifacts to reduce bias and equity deficits.	3A-I-6-29	Redesign user interfaces (e.g., webpages, mobile applications, animations) to be more inclusive, accessible, and minimizing the impact of the designer's inherent bias.
3A-IC-26	Demonstrate ways a given algorithm applies to problems across disciplines.	3A-I-7-25	Describe how computation shares features with art and music by translating human intention into an artifact.

9–10 Final	Level 3A	9–10 Interim	Level 3A
3A-IC-27	Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.	3A-I-1-27	Demonstrate how computing enables new forms of experience, expression, communication, and collaborating.
3A-IC-28	Explain the beneficial and harmful effects that intellectual property laws can have on innovation	3A-I-2-22	Debate the social and economic implications associated with ethical and unethical computing practices (e.g., intellectual property rights, hacktivism, software piracy, diesel emissions testing scandal, new computers shipped with malware).
3A-IC-29	Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.	3A-I-7-24	Discuss implications of the collection and large-scale analysis of information about individuals (e.g., how businesses, social media, and government collect and use personal data).
3A-IC-30	Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.	3A-I-7-23	Compare and contrast information access and distribution rights.
	Removed	3A-I-1-28	Explain the impact of the digital divide (i.e., uneven access to computing, computing education, and interfaces) on access to critical information.
	Removed	3A-A-5-6	Integrate grade-level appropriate mathematical techniques, concepts, and processes in the creation of computing artifacts.
	Removed	3A-A-3-10	Design algorithms using sequence, selection, and iteration.

CSTA & ACM, (2016), *Interim CSTA K-12 Computer Science Standards*

9–10 Final	Level 3A	9–10 Interim	Level 3A
	Removed	3A-C-5-14	Create, extend, or modify existing programs to add new features and behaviors using different forms of inputs and outputs (e.g., inputs such as sensors, mouse clicks, data sets; outputs such as text, graphics, sounds).
	Removed	3A-C-4-15	Demonstrate the role and interaction of a computer embedded within a physical system, such as a consumer electronic, biological system, or vehicle, by creating a diagram, model, simulation, or prototype.
	Removed	3A-C-4-16	Describe the steps necessary for a computer to execute high compilation to machine language, interpretation, fetch-decode-execute https://www.cise.ufl.edu/~mssz/CompOrg/CDAintro.html.
	Removed	3A-N-3-34	Use simple encryption and decryption algorithms to transmit/receive an encrypted message.

REVERSED TABLE

9–10 Interim	Level 3A	9–10 Final	Level 3A
3A-A-2-1	Design and develop a software artifact working in a team.	3A-AP-22	Design and develop computational artifacts working in team roles using collaborative tools.
3A-A-2-2	Demonstrate how diverse collaborating impacts the design and development of software products (e.g., discussing real-world examples of products that have been improved through having a diverse design team or reflecting on their own team's development experience).	3A-AP-19	Systematically design and develop programs for broad audiences by incorporating feedback from users.
3A-A-7-3	Compare and contrast various software licensing schemes (e.g., open source, freeware, commercial).	3A-AP-20	Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries.
3A-A-5-4	Design, develop, and implement a computing artifact that responds to an event (e.g., robot that responds to a sensor, mobile app that responds to a text message, sprite that responds to a broadcast).	3A-AP-16	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.
3A-A-5-5	Use user-centered research and design techniques (e.g., surveys, interviews) to create software solutions	3A-AP-21	Evaluate and refine computational artifacts to make them more usable and accessible.
3A-A-5-6	Integrate grade-level appropriate mathematical techniques, concepts, and processes in the creation of computing artifacts.		Removed

9–10 Interim	Level 3A	9–10 Final	Level 3A
3A-A-4-7	Understand the notion of hierarchy and abstraction in high-level languages, translation, instruction sets, and logic circuits.	3A-CS-02	Compare levels of abstraction and interactions between application software, system software, and hardware layers.
3A-A-4-8	Deconstruct a complex problem into simpler parts using predefined constructs (e.g., functions and parameters and/or classes).	3A-AP-17	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
3A-A-4-9	Demonstrate the value of abstraction for managing problem complexity (e.g., using a list instead of discrete variables).	3A-CS-01	Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.
3A-A-3-10	Design algorithms using sequence, selection, and iteration.		Removed
3A-A-3-11	Explain and demonstrate how modeling and simulation can be used to explore natural phenomena (e.g., flocking behaviors, queueing, life cycles).	3A-DA-11	Create interactive data visualizations using software tools to help others better understand real-world phenomena.
3A-A-6-12	Use a systematic approach and debugging tools to independently debug a program (e.g., setting breakpoints, inspecting variables with a debugger).	3A-CS-03	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
3A-C-7-13	Develop and apply criteria (e.g., power consumption, processing speed, storage space, battery life, cost, operating system) for evaluating a computer system for a given purpose (e.g., system specification needed to	3A-AP-21	Evaluate and refine computational artifacts to make them more usable and accessible.

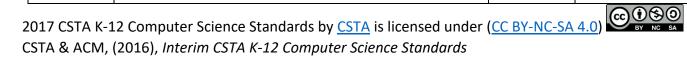| 9–10 Interim	Level 3A	9–10 Final	Level 3A
	run a game, web browsing, graphic design or video editing).		
3A-C-5-14	Create, extend, or modify existing programs to add new features and behaviors using different forms of inputs and outputs (e.g., inputs such as sensors, mouse clicks, data sets; outputs such as text, graphics, sounds).		Removed
3A-C-4-15	Demonstrate the role and interaction of a computer embedded within a physical system, such as a consumer electronic, biological system, or vehicle, by creating a diagram, model, simulation, or prototype.		Removed
3A-C-4-16	Describe the steps necessary for a computer to execute high compilation to machine language, interpretation, fetch-decode-execute https://www.cise.ufl.edu/~mssz/CompOrg/CDAintro.html.		Removed
3A-D-5-17	Create computational models that simulate real-world systems (e.g., ecosystems, epidemics, spread of ideas).	3A-DA-12	Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.
3A-D-4-18	Convert between binary, decimal, and hexadecimal representations of data (e.g., convert hexadecimal color codes to decimal percentages, ASCII/Unicode representation).	3A-DA-09	Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.

9–10 Interim	Level 3A	9–10 Final	Level 3A
3A-D-4-19	Analyze the representation tradeoffs among various forms of digital information (e.g., lossy versus lossless compression, encrypted vs. unencrypted, various image representations).	3A-DA-10	Evaluate the tradeoffs in how data elements are organized and where data is stored.
3A-D-3-20	Discuss techniques used to store, process, and retrieve different amounts of information (e.g., files, databases, data warehouses).	3A-AP-10	Evaluate the tradeoffs in how data elements are organized and where data is stored.
3A-D-3-21	Apply basic techniques for locating and collecting small- and large-scale data sets (e.g., creating and distributing user surveys, accessing real-world data sets).	3A-AP-13	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.
3A-I-2-22	Debate the social and economic implications associated with ethical and unethical computing practices (e.g., intellectual property rights, hacktivism, software piracy, diesel emissions testing scandal, new computers shipped with malware).	3A-IC-28	Explain the beneficial and harmful effects that intellectual property laws can have on innovation
3A-I-7-23	Compare and contrast information access and distribution rights.	3A-IC-30	Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.
3A-I-7-24	Discuss implications of the collection and large-scale analysis of information about individuals (e.g., how businesses, social media, and government collect and use personal data).	3A-IC-29	Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.

9–10 Interim	Level 3A	9–10 Final	Level 3A
3A-I-7-25	Describe how computation shares features with art and music by translating human intention into an artifact.	3A-IC-26	Demonstrate ways a given algorithm applies to problems across disciplines.
3A-I-1-26	Compare and debate the positive and negative impacts of computing on behavior and culture (e.g., evolution from hitchhiking to ridesharing apps, online accommodation rental services).	3A-IC-24	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
3A-I-1-27	Demonstrate how computing enables new forms of experience, expression, communication, and collaborating.	3A-IC-27	Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.
3A-I-1-28	Explain the impact of the digital divide (i.e., uneven access to computing, computing education, and interfaces) on access to critical information.		Removed
3A-I-6-29	Redesign user interfaces (e.g., webpages, mobile applications, animations) to be more inclusive, accessible, and minimizing the impact of the designer's inherent bias.	3A-IC-25	Test and refine computational artifacts to reduce bias and equity deficits.
3A-N-7-30	Describe key protocols and underlying processes of Internet-based services (e.g., http/https and SMTP/IMAP, routing protocols).	3A-NI-04	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing
3A-N-4-31	Illustrate the basic components of computer networks (e.g., draw logical and topological diagrams of networks	3A-NI-04	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing

9–10 Interim	Level 3A	9–10 Final	Level 3A
	including routers, switches, servers, and end user devices; create model with string and paper).		
3A-N-1-32	Compare and contrast multiple viewpoints on cybersecurity (e.g., from the perspective of security experts, privacy advocates, the government).	3A-NI-07	Compare various security measures, considering tradeoffs between the usability and security of a computing system.
3A-N-3-33	Explain the principles of information security (confidentiality, integrity, availability) and authentication techniques	3A-NI-05	Give examples to illustrate how sensitive data can be affected by malware and other attacks.
3A-N-3-33	Explain the principles of information security (confidentiality, integrity, availability) and authentication techniques	3A-NI-08	Explain tradeoffs when selecting and implementing cybersecurity recommendations
3A-N-3-34	Use simple encryption and decryption algorithms to transmit/receive an encrypted message.		Removed
3A-N-6-35	Identify digital and physical strategies to secure networks and discuss the tradeoffs between ease of access and need for security.	3A-NI-06	Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.
	New	3A-AP-14	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.
	New	3A-AP-15	Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made.

9–10 Interim	Level 3A	9–10 Final	Level 3A
	New	3A-AP-18	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
	New	3A-AP-23	Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.

9-10 CSTA Standards

9–10 Final	Level 3A
3A-CS-01	Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.
3A-CS-02	Compare levels of abstraction and interactions between application software, system software, and hardware layers.
3A-CS-03	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
3A-NI-04	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.
3A-NI-05	Give examples to illustrate how sensitive data can be affected by malware and other attacks.
3A-NI-06	Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.
3A-NI-07	Compare various security measures, considering tradeoffs between the usability and security of a computing system.
3A-NI-08	Explain tradeoffs when selecting and implementing cybersecurity recommendations.
3A-DA-09	Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.
3A-DA-10	Evaluate the tradeoffs in how data elements are organized and where data is stored.
3A-DA-11	Create interactive data visualizations using software tools to help others better understand real-world phenomena.
3A-DA-12	Create computational models that represent the relationships among different elements of data collected from a phenomenon or process.
3A-AP-13	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.
3A-AP-14	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.
3A-AP-15	Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made.
3A-AP-16	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.

9–10 Final	Level 3A
3A-AP-17	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
3A-AP-18	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
3A-AP-19	Systematically design and develop programs for broad audiences by incorporating feedback from users.
3A-AP-20	Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries.
3A-AP-21	Evaluate and refine computational artifacts to make them more usable and accessible.
3A-AP-22	Design and develop computational artifacts working in team roles using collaborative tools.
3A-AP-23	Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs.
3A-IC-24	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
3A-IC-25	Test and refine computational artifacts to reduce bias and equity deficits.
3A-IC-26	Demonstrate ways a given algorithm applies to problems across disciplines.
3A-IC-27	Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.
3A-IC-28	Explain the beneficial and harmful effects that intellectual property laws can have on innovation.
3A-IC-29	Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.
3A-IC-30	Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.