Alaska Standards Alignment with CodeX Curriculum

	Unit 1	Unit 2	Unit 3
Computing Systems			
5.CS.D.01 Define, discuss, and model how computer hardware and software work together as a system to accomplish tasks (e.g., input, output, processor, sensors, and storage).	[1]		
5.CS.HS.01 Define, discuss, and model how information flows through hardware and software to accomplish tasks such as converting a word to binary.			
5.CS.T.01 Identify, discuss, and apply strategies for solving simple hardware and software problems that may occur using everyday use (e.g., rebooting the device; checking the power; force shut down of an application).	[2]		
Networks & the Internet			
5.NI.NCO.01 Recognize, explain, and model how information is broken down into packets (smaller pieces), transmitted between devices, and reassembled.			
5.NI.C.01 Discuss real-world cybersecurity problems and how personal information can be protected.			
Data and Analysis			
5.DA.S.01 Using correct terminology explain why various types of files differ in size (e.g., video, images and documents).			
5.DA.CVT.01 Collect, organize, interpret, and display data to highlight relationships and support a claim.			
5.DA.IM.01 Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.			
Algorithms and Programming			
5.AP.A.01 Compare and refine multiple algorithms for the same task and determine which is the most appropriate.			
5.AP.V.01 Create programs that use variables to store and modify data.	[3]		
5.AP.M.01 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.	[4]		
5.AP.PD.01 Define the concept of abstraction and create increasingly complex programs.			
5.AP.PD.02 Observe intellectual property rights and give appropriate attribution when creating or remixing programs.			
Community, Global and Ethical Impacts			
5.CGEI.C.01 Discuss ongoing trends in technologies that have changed the world, and express how those trends influence and are influenced by cultural practices.			
5.CGEI.C.02 Brainstorm ways to improve the accessibility and usability of technology products for the diverse needs and wants of users.			
5.CGEI.SI.01 Develop a code of conduct, explain, and practice grade-level appropriate behavior and responsibilities while participating in an online community. Identify and report inappropriate behavior.			
5.CGEI.SI.02 As a team, collaborate with outside resources (other grade levels, online collaborative spaces) to include diverse perspectives to improve computational products.			
5.CGEI.SLE.01 Observe intellectual property rights, give appropriate credit when using resources and consider the licenses on computational artifacts while using resources.			

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	Unit 1	Unit 2	Unit 3
Computing Systems			
6.CS.D.01 Review and analyze device(s) based on personal use and recommend improvements to the device.			
6.CS.HS.01 Identify ways that hardware and software (User Interface) design are combined to collect and exchange data.			
6.CS.T.01 Identify and discuss increasingly complex software and hardware problems with computing devices and their components.			
Networks & the Internet			
6.NI.NCO.01 Model a simple protocol for transferring information using packets.			
6.NI.C.01 Identify existing cybersecurity concerns with the Internet and systems it uses.			
6.NI.C.02 Explain the importance of secured websites and describe how one method of encryption works.			
Data and Analysis			
6.DA.S.01 Identify how the same data can be represented in multiple ways.			
6.DA.CVT.01 Collect data using computational tools and transform the data to make it more useful (e.g., spreadsheet formulas)			
6.DA.IM.01 Use models and simulations to formulate, refine, and test hypotheses.	[5]		
Algorithms and Programming			
6.AP.A.01 Use an existing algorithm in natural language or pseudocode to solve complex problems	[6]		
6.AP.V.01 Develop programs that utilize combinations of repetition, conditionals, functions, and the manipulation of variables representing different data types.	[7]		
6.AP.M.01 Decompose (break down) problems into abstraction layers to facilitate the design, implementation, and review of programs.	[8]		
6.AP.PD.01 Seek and incorporate feedback from team members to refine a solution to a problem.			
6.AP.PD.02 Incorporate existing code, media, and libraries into original programs and give attribution.	[9]		
6.AP.PD.03 Test and refine programs using teacher provided inputs.			
6.AP.PD.04 Break down tasks and follow an individual timeline when developing a computational artifact.			
6.AP.PD.05 Document block-based or text-based programs in order to make them easier to follow, test, and debug.	[10]		
Community, Global and Ethical Impacts			
6.GCEI.C.01 Explain how computing impacts people's' everyday activities and explore careers related to the field of computer science.			
6.GCEI.C.02 Identify and discuss the technology proficiencies needed in the classroom and the workplace, and how to meet the needs of diverse users.			
6.GCEI.SI.01 Individually and collaboratively develop and conduct an online survey that seeks input from a broad audience. Describe and use safe, appropriate, and responsible practices (netiquette) when participating in online communities (e.g., discussion groups, blogs, social networking sites).			
6.GCEI.SLE.01 Differentiate between appropriate and inappropriate content on the Internet, and identify unethical and illegal online behavior.			
6.GCEI.SLE.02 Identify what distinguishes humans from machines focusing on human intelligence versus machine intelligence (e.g., robot motion; speech and language understanding; computer vision).			

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	Unit 1	Unit 2	Unit 3
Computing Systems			
7.CS.D.01 Review, analyze, and evaluate device(s) and how other users interact with devices and recommend improvements to design.			
7.CS.HS.01 Evaluate and recommend improvements to hardware and software (User Interface) design to collect and exchange data.			
7.CS.T.01 Identify and fix increasingly complex software and hardware problems with computing devices and their components.			
Networks & the Internet			
7.NI.NCO.01 Explain how a system recovers when a packet is lost and the effect it has on the transferredinformation.			
7.NI.C.01 Explain how to protect electronic information, both physical and digital, identify cybersecurity concerns and options to address issues with the Internet and the systems it uses.			
7.NI.C.02 Identify and explain two or more methods of encryption used to ensure and secure the transmission of information.			
Data and Analysis			
7.DA.S.01 Create multiple representations of data.			
7.DA.CVT.01 Collect data using computational tools and transform the data to make it more useful and reliable.			
7.DA.IM.01 Discuss the correctness of a model representing a system by comparing the model's generated results with observed data from the modeled system.			
Algorithms and Programming			
7.AP.A.01 Select and modify an existing algorithm in natural language or pseudocode to solve complex problems.	[11]		
7.AP.V.01 Develop programs that utilize combinations of repetition, compound conditionals, functions, and the manipulation of variables representing different data types.	[12]		
7.AP.M.01 Decompose (break down) problems into abstraction layers to facilitate the design, implementation, and review of increasingly complex programs.	[13]		
7.AP.PD.01 Seek and incorporate feedback from team members and users to refine a solution to a problem.			
7.AP.PD.02 Incorporate existing code, media, and libraries into original programs of increasing complexity and give attribution.	[14]		
7.AP.PD.03 Test and refine programs using a variety of student created inputs.	[15]		
7.AP.PD.04 Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts.			
7.AP.PD.05 Document block-based or text-based programs of increasing complexity in order to make them easier to follow, test, and debug	[16]		
Community, Global and Ethical Impacts			
7.GCEI.C.01 Explain how computing impacts innovation in other fields and explore carriers related to the field of computer science.			
7.GCEI.C.02 Relate the distribution of computing resources in a global society to issues of equity, access, andpower.			
7.GCEI.SI.01 Individually and collaboratively use advanced tools to design and create online content (e.g., digital portfolio, multimedia, blog, web page). Describe and use safe, appropriate, and responsible practices (netiquette) when participating in online communities (e.g., discussion groups, blogs, social networking sites).			
7. GCEI.SLE.01 Explain the connection between the longevity of data on the Internet, personal online identity, and personal privacy.			
7.GCEI.SLE.02 Describe ways in which computers use models of intelligent behavior (e.g., robot motion; speech and language understanding; computer vision).			

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	Unit 1	Unit 2	Unit 3
Computing Systems			
8.CS.D.01 Develop and implement a process to evaluate existing computing devices and recommend improvements to design based on analysis of how other users interact with the device.			
8.CS.HS.01 Design and refine projects that combine hardware and software (User Interface) to collect and exchange data.			
8.CS.T.01 Systematically identify, fix, and document increasingly complex software and hardware problems with computing devices and their components.			
Networks & the Internet			
8.NI.NCO.01 Explain protocols and their importance to data transmission; model how packets are broken down into smaller pieces and how they are delivered.			
8.NI.C.01 Evaluate physical and digital procedures that could be implemented to protect electronic data/information. Explain the impacts of malware (e. g., hacking, ransomware).			
8.NI.C.02 Compare the advantages and disadvantages of multiple methods of encryption to model the secure transmission of information.			
Data and Analysis			
8.DA.S.01 Analyze multiple methods of representing data and choose the most appropriate method for representing data.			
8.DA.CVT.01 Develop, implement, and refine a process that utilizes computational tools to collect and transform data to make it more useful and reliable			
8.DA.IM.01 Refine computational models based on the data generated by the models.			
Algorithms and Programming			
8.AP.A.01 Design algorithms in natural language, flow and control diagrams, comments within code, and/or pseudocode to solve complex problems.	[17]		
8.AP.V.01 Develop programs that utilize combinations of nested repetition, compound conditionals, functions, and the manipulation of variables representing different data types.	[18]		
8.AP.M.01 Decompose (break down) problems and sub-problems into abstraction layers to facilitate the design, implementation, and review of complex programs.	[19]		
8.AP.PD.01 Seek and incorporate feedback from team members and users to refine a solution to a problem that meets the needs of diverse users.			
8.AP.PD.02 Incorporate existing code, media, and libraries into original programs of increasing complexity and give attribution.	[20]		
8.AP.PD.03 Systematically test and refine programs using a range of student created inputs.	[21]		
8.AP.PD.04 Explain how effective communication between participants is required for successful collaboration when developing computational artifacts.			
Community, Global and Ethical Impacts			
8.GCEI.C.01 Describe the trade-offs associated with computing technologies, explaining their effects on economies and global societies, and explore community and global careers related to the field of computer science (e.g., automation).			
8.GCEI.C.02 Evaluate and improve the design of existing technologies to meet the needs of diverse users and increase accessibility and usability. Evaluate how technology can be used to distort, exaggerate, and misrepresent information.			
8.GCEI.SI.01 Communicate and publish key ideas and details individually or collaboratively in a way that informs, persuades, and/or entertains using a variety of digital tools and media-rich resources. Describe and use safe, appropriate, and responsible practices (netiquette) when participating in online communities (e.g., discussion groups, blogs, social networkingsites).			
8. GCEI.SLE.01 Discuss the social impacts and ethical considerations associated with cybersecurity, including the positive and malicious purposes of hacking.			
8.GCEI.SLE.02 Compare and contrast human intelligence and computer intelligence (e.g., emotional decision making versus logical decisions; common sense; literal versus abstract).			

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Entry level employment competence	Unit 1	Unit 2	Unit 3
Computing Systems			
L1.CS.D.01 Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.			
L1.CS.T.01 Develop and apply criteria for systematic discovery of errors and strategies for correction in computing systems.			
Networks & the Internet			
L1.NI.NCO.01 Evaluate the scalability and reliability of networks by identifying and illustrating the basic components of computer networks and network protocols (e.g., routers, switches, servers, IP, DNS).			
L1.NI.C.04 Explain tradeoffs when selecting and implementing cybersecurity recommendations from multiple perspectives such as the user, enterprise, and government.			
Data and Analysis			
L1.DA.S.01 Translate and compare different bit representations of real-world phenomena, such as characters, numbers, and images.			
L1.DA.S.02 Review different database types.			
L1.DA.CVT.01 Use tools and techniques to locate, collect and create visualizations of small and large-scale data sets (e.g., paper surveys, online data sets, etc.).			
L1.DA.IM.01 Use computational models such as data analysis, pattern recognition, and/or simulations to show the relationships between collected data elements			
Algorithms and Programming			
L1.AP.A.01 Use algorithms (e.g., sequencing, selection, iteration, recursion, etc.) to create a prototype to provide a possible solution for a common problem.	[22]		
L1.AP.V.01 Demonstrate the use of lists to simplify solutions and to generalize computation problems instead of repeatedly using simple variables.		[23]	
L1.AP.C.01 Justify the selection of specific control structures when trade-offs involve implementation, readability, and program performance.			
L1.AP.C.02 Develop an event-based program that will solve a practical problem, or allow self-expression.	[24]		
L1.AP.M.02 Create computational artifacts by using common structures to organize, manipulate and/or process data.			
L1.AP.PD.01 Create software by analyzing a problem and/or process, developing a solution, testing outcomes, debug, documenting, and adapting the program for a variety of users.	[25]		
L1.AP.PD.02 Classify and define a variety of software licensing schemes and discuss the advantages and disadvantages of the different schemes in software development (e.g. open source, freeware, commercial).			
L1.AP.PD.03 Evaluate and refine computational artifacts to make them more user- friendly, efficient and/or accessible.			
L1.AP.PD.04 Design and develop a computational artifact while working in a team.			
L1.AP.PD.05 Using visual aids and documentation, illustrate the design elements and data flow of the development of a complex program (e.g. flowcharts, pseudocode, etc.).	[26]		
Community, Global and Ethical Impacts			
L1.CGEI.C.01 Test and refine computational artifacts to reduce bias and equity deficits.			
L1.CGEI.C.02 Demonstrate how a given algorithm applies to problems across disciplines.			
L1.CGEI.SI.01 Demonstrate how computing increases connectivity to people in various cultures.			
L1.CGEI.SLE.1 Explain the beneficial and harmful effects that intellectual property laws can have on innovation.			
L1.CGEI.SLE.2 Explain the privacy concerns related to the collection and large scale analysis of information about individuals that may not be evident to users (e.g., how businesses, social media, and the government collects and uses data).			
L1.CGEI.SLE.3 Evaluate the social and economic implications as related to privacy, data, property, information, and identity in the context of safety, law, or ethics.			
L1.CGEI.SLE.4 Describe the beneficial and intrusive aspects of advancing and emerging technologies (e.g., artificial intelligent agents, IoT, robotics).			
L1.CGEI.SLE.5 Discuss diverse careers that are influenced by computer science and its availability to all regardless of background.			

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Post-Secondary education	Unit 1	Unit 2	Unit 3
Computing Systems			
L2.CS.HS.01 Identify the interactions of an operating system between software and hardware.			
Networks & the Internet			
L2.NI.NCO.01 Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).			
L2.NI.C.01 Compare and refine ways in which software developers protect devices and information from unauthorized access.			
L2.NI.C.02 Learn detection and prevention methods to respond to attacks on sensitive data. Develop a response plan that enables recovery from such attacks.			
Data and Analysis			
L2.DA.S.01 Evaluate and explain the various types of databases, with their specific benefits and limitation.			
L2.DA.CVT.01 Use data analysis tools and techniques to identify patterns from complex real- world phenomena.			
L2.DA.CVT.02 Generate data sets that support a claim or communicates information using a variety of data collection tools and analysis techniques.			
L2.DA.IM.01 Use models and simulations to help formulate, refine, and test scientific hypotheses.			
Algorithms and Programming			
L2.AP.A.01 Describe how artificial intelligence drives many software and physical systems (e.g., autonomous robots, computer vision, pattern recognition, text analysis).			
L2.AP.A.02 Develop an artificial intelligence algorithm to play a game against a human opponent or solve a common problem.			
L2.AP.A.03 Critically examine and adapt classic algorithms (e.g. selection sort, insertion sort, etc.).			
L2.AP.A.04 Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency, correctness, and clarity			
L2.AP.V.01 Compare and contrast simple data structures and their uses (e.g., arrays, lists, stacks, queues, maps, trees, graphs, and databases).			
L2.AP.C.01 Trace the execution of recursive algorithms, illustrating output and changes in values of named variables.	[27]		
L2.AP.M.01 Construct solutions to problems using student-created components, such as functions, procedures, modules, and/or objects.	[28]		
L2.AP.M.02 Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.			
L2.AP.M.03 Create programming solutions using code reuse and applied technique with appropriate attribution (e.g., libraries, APIs, collaboration software, and versioning software).	[29]		
L2.AP.PD.01 Compare multiple programming languages and discuss features that make them useful for solving problems and developing systems.			
L2.AP.PD.02 Using the software life cycle process, create software that will provide solutions for a variety of users.			
L2.AP.PD.03 Design software in a project team environment using Agile Development methods (e.g., versioning and collaboration systems).			
L2.AP.PD.04 Explain security issues that might lead to compromised computer programs.			
L2.AP.PD.05 Develop programs for multiple computing platforms			
L2.AP.PD.06 Develop and use a series of test cases to verify that a program performs according to its design specifications.	[30]		
L2.AP.PD.07 Through peer review systematically check code for correctness, usability, readability, efficiency, portability, and scalability (e.g. code review).	[31]		
L2.AP.PD.08 Modify an existing program to add additional functionality and discuss intended and unintended implications with appropriate attribution.	[32]		
Community, Global and Ethical Impacts			
L2.CGEI.C.01 Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society.			
L2.CGEI.C.02 Based on research, evaluate how computing has revolutionized an aspect of our culture and predict how it might evolve (e.g., education, healthcare, art/entertainment, and energy).			
L2.CGEI.SLE.1 Debate laws and regulations that impact the development and use of software.			
L2.CGEI.SLE.2 Identify the ethical and moral implications encountered in managing and curating knowledge (e.g., harvesting; information overload; knowledge management; reposting; sharing; summarizing).			
L2.CGEI.SLE.3 Explain how cutting-edge technology may affect the way business is conducted in the future (e.g., eCommerce, entrepreneurship, payment methods, business responsibilities).			

[1] Mission 2 explains inputs and outputs working together

[2] Mission 2 discusses troubleshooting as does the teachers' manual and Mission 1 when we introduce the word debugging.

[3] 3.8 begins the use of variables

[4] Mission 4 begins the remixes

[5] Flowcharts and pseudocodes beginning in Mission 4

[6] use of libraries in all lessons

[7] 4.2 begins data types
4.3 variable manipulation
4.7 conditionals
4.10 repetition
Mission 4 begins the use of functions

[8] Code tracing Chart
Pseudocodes
Flowcharts
All are discussed in the teachers manual

[9] All of our lessons use and explain the use of libraries

[10] Code Tracing Chart

[11] use of libraries in all lessons

[12] 4.2 begins data types
4.3 variable manipulation
4.7 conditionals
4.10 repetition
Mission 4 begins the use of functions
Mission 6 compound conditionals

[13] Code tracing Chart
Pseudocodes
Flowcharts
All are discussed in the teachers manual

[14] All of our lessons use and explain the use of libraries

[15] Remixes cover this depending on the rubric the teacher gives them

[16] Code Tracing Chart

[17] use of libraries in all lessons

[18] 4.2 begins data types
4.3 variable manipulation
4.7 conditionals
4.10 repetition
Mission 4 begins the use of functions
Mission 6 compound conditionals
Mission 6 begins nested loops but does not explain them

[19] Code tracing Chart
Pseudocodes
Flowcharts
All are discussed in the teachers manual

[20] All of our lessons use and explain the use of libraries

[21] Remixes cover this depending on the rubric the teacher gives them

[22] Mission 4 begins the use of remixes

[23] Mission 7 Lists are introduced

[24] Mission 4 begins the use of remixes

[25] Remixes cover this depending on the rubric the teacher gives the students

[26] Teachers Manual discusses the use of flowcharts and pseudocodes

[27] Code Tracing Charts
Flowcharts
Pseudocodes
As well as our Debugger and the step in function

[28] Remixes cover this depending on the rubric the teacher gives the students

[29] All of our lessons use libraries and we explain them each time a new one is introduced.

[30] Code Tracing Chart accomplishes this

[31] Teacher can require remixes to be peer reviewed using the Code Tracing Chart

[32] Remixes cover this