

Skill Struck's alignment to

Ohio's Learning Standards: Computer Science

Legend

- ✓ = Standard aligned
- ♦ = Not currently aligned

Standard	Status
CS.D.K.a With guidance, identify and label commonly used devices and their components, explaining their connection to different tasks, to perform a variety of tasks.	✓
CS.HS.K.a With guidance and support, identify and use hardware and software necessary for accomplishing a task.	✓
CS.T.K.a With guidance and support, use problem solving strategies to troubleshoot a problem.	✓
NI.N.K.a With guidance and support, create a list of ways information can be shared electronically to gain a deeper understanding of how information is transmitted (e.g., email, social media).	✓
NI.C.K.a With guidance and support, identify and use secure practices (e.g.,	✓

passwords) to protect private information.	
DA.DCS.K.a Identify data to collect and sort.	✓
DA.DCS.K.b With guidance and support, demonstrate how data can be collected and stored in a variety of ways.	✓
DA.VC.K.a With guidance, organize and present data in various formats to make observations.	✓
DA.IM.K.a With guidance, create a model of an object or process to identify patterns.	✓
ATP.A.K.a With guidance and support, model a real-world process by constructing and following step-by-step directions (i.e., algorithms) to complete tasks.	✓
ATP.VDR.K.a Recognize that a group of items (e.g., numbers, symbols or pictures) can be used to represent data.	✓
ATP.CS.K.a With guidance and support, model a sequence of instructions (i.e., program) with a beginning, middle and end to solve a problem or express an idea.	✓
ATP.PD.K.a With guidance and support, plan or create an artifact to illustrate thoughts, ideas and problems in a sequential (step-by-step) manner (e.g., story map, storyboard, sequential graphic organizer).	✓
IC.Cu.K.a With guidance and support, identify technologies that impact one's own	✓

everyday life.	
IC.Cu.K.b With guidance and support, recognize different ways computing devices are used regularly to understand technology's impact on one's own daily life.	✓
IC.SI.K.a With guidance and support, identify and use safe and responsible behaviors concerning information and technology.	✓
IC.SLE.K.a With guidance, discuss appropriate uses of technology to support informed decisions.	✓
CS.D.1.a Operate commonly used devices and their components to perform a variety of tasks.	✓
CS.HS.1.a With guidance, describe and use hardware and software necessary for accomplishing a task.	✓
1. CS.HS.01 Identify and describe functions of common computing devices and external hardware (e.g., mobile devices, desktop computer, laptop computer, mouse, keyboard, printer, wearables).	✓
CS.T.1.a With guidance, use problem solving strategies to troubleshoot a problem.	✓
NI.N.1.a Create a list of ways information can be shared electronically to gain a deeper understanding of how information is transmitted (e.g., email, social media).	✓
NI.N.1.b	♦

Recognize that computing devices can be connected to retrieve information from the global community.	
NI.C.1.a Identify and use secure practices (e.g., passwords) to protect private information.	✓
DA.DCS.1.a With guidance, collect and organize data to retrieve for later use.	✓
DA.DCS.1.b With guidance, demonstrate how data can be collected and stored in a variety of ways.	✓
DA.VC.1.a Organize and present data in various formats to make observations.	✓
DA.IM.1.a Create and explain a model of an object or process that includes patterns and key elements.	✓
ATP.A.1.a With guidance, model a real-world process by constructing and following step-by-step directions (i.e., algorithms) to complete tasks.	✓
ATP.VDR.1.a Categorize a group of items (e.g., numbers, symbols or pictures) based on the attributes or actions of each item, with or without a computing device.	✓
ATP.CS.1.a With guidance, model a sequence of instructions (i.e., program) that includes repetition (i.e., loops) to solve a problem or express ideas.	✓
ATP.M.1.a With guidance, break down (i.e., decompose) a series of steps and separate the necessary from the unnecessary steps to create a precise	✓

sequence of instructions to solve a problem or express an idea.	
ATP.PD.1.a With guidance, plan and create an artifact to illustrate thoughts, ideas and problems in a sequential (step-by-step) manner (e.g., story map, storyboard, sequential graphic organizer).	✓
ATP.PD.1.b With guidance, identify and fix (i.e., debug) a multi-step process that includes sequencing.	✓
IC.Cu.1.a Discuss different technologies and their impact on everyday life.	✓
IC.Cu.1.b Identify how people use and are impacted by many types of technologies in their daily work and personal lives.	✓
IC.SI.1.a With guidance, describe safe and responsible behaviors for the use of information and technology.	✓
IC.SLE.1.a With guidance, discuss appropriate and ethical uses of technology to guide informed decisions.	✓
CS.D.2.a Select and operate commonly used devices to perform a variety of tasks.	✓
CS.HS.2.a Select and use hardware and software necessary for accomplishing a task.	✓
CS.T.2.a Use problem solving strategies to troubleshoot a problem.	✓
NI.N.2.a	✓

Describe how information can be communicated electronically to gain a deeper understanding of how information is transmitted (e.g., email, social media).	
NI.N.2.b Use computing devices that are connected to share and receive information from the global community.	♦
NI.C.2.a Explain and demonstrate secure practices (e.g., creating strong passwords) to protect private information.	✓
DA.DCS.2.a Collect and organize data to store, retrieve and modify.	✓
DA.DCS.2.b Manipulate data to perform various tasks.	✓
DA.VC.2.a Organize, analyze and present data in various formats.	✓
DA.IM.2.a Interpret and analyze data, graphs, models or charts.	✓
ATP.A.2.a Model a real-world process by constructing and following step-by-step instructions (i.e., algorithms) to complete tasks.	✓
ATP.VDR.2.a Construct a model that shows the way programs store and manipulate data by using numbers or other symbols to represent information.	✓
ATP.CS.2.a Develop a program that uses sequencing and repetition (i.e., loops) to solve a problem or express ideas.	✓
ATP.M.2.a	✓

Break down (i.e., decompose) a series of steps and separate the necessary from the unnecessary steps to create a precise sequence of instructions to solve a problem or express an idea.	
ATP.PD.2.a Plan and create an artifact to illustrate thoughts, ideas and problems in a sequential (step-by-step) manner (e.g., story map, storyboard, sequential graphic organizer).	✓
ATP.PD.2.b Identify and fix (i.e., debug) a multi-step process that includes sequencing.	✓
IC.Cu.2.a Compare and contrast how the use of technology has changed to understand its impact on everyday life.	✓
IC.Cu.2.b Describe the ways people use technologies in their daily work and personal lives to understand technology's impact on one's community.	✓
IC.SI.2.a Compare and contrast safe and responsible behaviors to those that are not when using information and technology.	✓
IC.SLE.2.a Discuss appropriate and ethical uses of technology to guide informed decisions.	✓
CS.D.3.a Explore common components (i.e., parts) of a computing system and their function to understand and describe the role they play in a computer system.	✓
CS.HS.3.a Identify and use digital learning tools/devices to support planning, implementing and reflecting upon a defined task.	✓

CS.T.3.a Apply troubleshooting strategies given problems and solutions to resolve hardware and software problems.	✓
NI.N.3.a Describe how communication occurs when information is sent and received over physical or wireless paths to explain communication systems (e.g., sending an email or visiting a website).	✓
NI.N.3.b Recognize that every device on a network has a unique identification to share or receive information from the global community.	♦
NI.C.3.a Explore digital safety concepts in order to explain that information can be both public and private, to determine what information can safely be shared and to know how to use passwords to protect information.	✓
DA.DCS.3.a Collect quantitative data over time from multiple sources to perform various tasks.	✓
DA.DCS.3.b Identify different types of information to store in different formats.	✓
DA.VC.3.a Create a chart or graph to inform a target audience about observations and data collected.	✓
DA.IM.3.a Utilize data to make predictions and discuss whether there is adequate data to make reliable predictions.	✓
ATP.A.3.a Construct and reflect on errors in an algorithm to accomplish a given task.	✓

ATP.VDR.3.a Define and identify a variable, a placeholder for storing a value, to understand how it is used in a multi-step process (i.e., algorithm).	✓
ATP.CS.3.a Create a program using sequences, events, loops and conditionals to solve a problem.	✓
ATP.M.3.a Decompose (i.e., break down) the steps needed or not needed (i.e., abstraction) into precise sequences of instructions to design an algorithm.	✓
ATP.PD.3.a Use a design process to plan the development of a program that solves problems.	✓
ATP.PD.3.b Using a given program known to contain errors, identify and debug errors to ensure it works.	✓
IC.Cu.3.a Identify computing technologies that have changed the world and express how those technologies influence and are influenced by cultural practice.	✓
IC.Cu.3.b Identify how computing devices have built-in features to increase accessibility to all users.	✓
IC.SI.3.a Collaborate and consider diverse perspectives to improve digital artifacts.	✓
IC.SLE.3.a Use public domain or Creative Commons media, and refrain from copying or using material created by others without permission.	✓

IC.SLE.3.b Determine whether information should be shared or kept private to protect student identity.	✓
IC.SLE.3.c Communicate the importance of information security to protect one's own digital footprint.	✓
CS.D.4.a Explore external components (i.e., parts) of a computing system and their function to understand and describe the role they play in a computer system.	✓
CS.HS.4.a Select and use digital learning tools/devices to support planning, implementing and reflecting upon a defined task.	✓
CS.T.4.a Diagnose problems and select an appropriate solution from a list of problems and solutions to resolve hardware and software issues.	✓
NI.N.4.a Describe how information is broken down to be transmitted over a network to help students gain a better understanding of the internet and networks.	✓
NI.N.4.b Describe network addresses, names and rules (i.e., protocols) to share or receive information from the global community.	♦
NI.C.4.a Describe what information should be protected and the importance of a secure password to protect information.	✓
DA.DCS.4.a Gather and organize multiple quantitative data elements using a tool to perform various tasks.	✓

DA.DCS.4.b Identify techniques and formats to store, process and retrieve different types of information.	✓
DA.VC.4.a Organize data into subsets to provide different views or commonalities and present insights gained using visual or other types of representations.	✓
DA.IM.4.a Utilize data to make predictions and discuss whether there is adequate data to make reliable predictions.	✓
ATP.A.4.a Construct and refine an algorithm to accomplish a given task.	✓
ATP.VDR.4.a Identify and use a variable, a placeholder for storing a value, to understand how it works in a multi-step process (i.e., algorithm).	✓
ATP.CS.4.a Create a program using sequences, events, loops and conditionals to solve a problem.	✓
ATP.M.4.a Decompose (i.e., break down) the steps needed or not needed (i.e., abstraction) into precise sequences of instructions to design an algorithm.	✓
ATP.PD.4.a Use a design process to plan and develop a program that addresses a multi-step problem.	✓
ATP.PD.4.b Using guided questions, work through a program to identify errors and discuss possible solutions to repair the program.	✓
IC.Cu.4.a	✓

List examples of computing technologies that have changed the global community to express how those technologies influenced and are influenced by cultural practice.	
IC.Cu.4.b Identify and anticipate diverse user needs to increase accessibility to all users.	✓
IC.SI.4.a Collaborate and consider diverse perspectives to improve digital artifacts.	✓
IC.SLE.4.a Use public domain or Creative Commons media, and refrain from copying or using material created by others without permission.	✓
IC.SLE.4.b Explain why information should be shared or kept private to protect student identity.	✓
IC.SLE.4.c Communicate the importance of protecting your digital footprint.	✓
CS.D.5.a Explore the internal parts of the computing system and their function to understand and describe the role they play in a computer system.	✓
CS.HS.5.a Evaluate digital learning tools/devices to support planning, implementing and reflecting across curricular areas.	✓
CS.T.5.a Diagnose problems and develop strategies to resolve technology issues.	✓
NI.N.5.a Model how information is broken down to be transmitted and then reassembled to help students gain a better understanding of the internet	✓

and networks.	
NI.N.5.b Apply knowledge of network addresses, names and rules (i.e., protocols) to discuss real-world scenarios.	♦
NI.C.5.a Demonstrate password creation techniques to develop and use a strong password used on personal accounts.	✓
DA.DCS.5.a Gather and organize multiple quantitative data elements using a tool to perform various tasks.	✓
DA.DCS.5.b Compare and contrast file formats to demonstrate the advantages and disadvantages of each.	✓
DA.VC.5.a Organize and present collected data using visual or other types of representations to highlight relationships and support a claim.	✓
DA.IM.5.a Utilize data to propose cause and effect relationships and predict outcomes.	✓
ATP.A.5.a Evaluate a multi-step process to diagram the proper steps to solve a problem.	✓
ATP.VDR.5.a Create a variable, a placeholder for storing a value, to understand how it is used in a multi-step process (i.e., algorithm).	✓
ATP.CS.5.a Create a program using sequences, events, loops and conditionals to	✓

solve a problem.	
ATP.M.5.a Decompose (i.e., break down) the steps needed or not needed (i.e., abstraction) into precise sequences of instructions to design an algorithm.	✓
ATP.M.5.b With grade appropriate complexity, modify, remix or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.	✓
ATP.PD.5.a Use a design process to plan and develop a program that includes multiple steps and end user preferences.	✓
ATP.PD.5.b Using guided questions, work through a program to identify errors and discuss possible solutions to repair the program.	✓
IC.Cu.5.a Explain how computing technologies have changed the global community and express how those technologies influence and are influenced by cultural practices.	✓
IC.Cu.5.b Develop, test and refine digital artifacts to improve accessibility and usability.	✓
IC.SI.5.a Collaborate and consider diverse perspectives to improve digital artifacts.	✓
IC.SLE.5.a Use public domain or Creative Commons media, and refrain from copying or using material created by others without permission.	✓
IC.SLE.5.b	✓

Communicate the effects of sharing personal information on the safety of student identity to determine how to protect students.	
IC.SLE.5.c Evaluate the need to keep personal information secure and protect the digital footprint.	✓
CS.D.6.a Identify the benefits and limitations of a given computing device's functions (including individual components) to explain how the functions and components work together to create the computing system.	✓
CS.HS.6.a Identify ways that hardware and software work together as a system to collect and exchange data.	✓
CS.T.6.a Use a systematic process to identify and evaluate the source of a routine computing problem. Select the best solution to solve the computing problem and communicate the solution to others.	✓
NI.N.6.a Identify the role of hardware components to understand the infrastructure of networks and the internet (including cloud servers).	✓
NI.N.6.b Identify protocols (i.e., rules) and explain why they are used to transmit data across networks and the internet.	✓
NI.C.6.a Identify cybersecurity concerns and measures needed to protect electronic information.	✓
NI.C.6.b Identify the different types of malware to understand threats to data security.	✓

NI.C.6.c Identify ways to protect private information.	✓
NI.IOT.6.a Define and explore aspects of embedded devices, smart devices and intelligent devices and the way they record, observe and mimic human habits.	✓
NI.IOT.6.b Identify and define blockchains to recognize how every device made has unique identifiers and the weaknesses that allow programmers and hackers to see personally identifiable information.	✓
DA.DCS.6.a Identify and use an appropriate digital data collection tool to compile information.	✓
DA.DCS.6.b Select and utilize appropriate file formats to organize collected data.	✓
DA.DCS.6.c Utilize a file structure to logically organize data to support individual and collaborative work.	✓
DA.VC.6.a Identify and label patterns in models or representations to infer connections between data sets.	✓
DA.VC.6.b Create a spreadsheet utilizing formulas, functions and graphs to represent and analyze data.	✓
DA.IM.6.a Identify and utilize data sets to support or refute a hypothesis.	✓
ATP.A.6.a	✓

Compare and refine multiple algorithms for the same task to determine which is the most efficient.	
ATP.VDR.6.a Identify unknown values that need to be represented by a variable within a multi-step process.	✓
ATP.VDR.6.b Create variables and use them within a multi-step process.	✓
ATP.CS.6.a Identify and trace decisions and loops that exist in a multi-step process within a program.	✓
ATP.M.6.a Decompose problems into parts to facilitate the design, implementation and review of programs.	✓
ATP.PD.6.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.	✓
ATP.PD.6.b Test and trace to debug and refine code.	✓
AI.P.6.a Give examples of different types of computer perception that can extract meaning from sensory signals to understand how computers collect information from sensors.	✓
AI.P.6.b Give examples of how humans combine information from multiple modalities to understand how computers use sensors to collect data.	✓
AI.P.6.c Give examples of different types of computer perception that can extract	✓

meaning from sensory signals to show the connection between sensors and computer perception.	
AI.P.6.d Classify a given image (e.g., "traffic scene", "nature scene", "social gathering", etc.) and then describe the kinds of knowledge a computer would need in order to understand scenes of this type to utilize the image in an algorithm.	✓
AI.RR.6.a Illustrate how a computer can solve a maze, find a route on a map or reason about concepts in a knowledge graph by drawing a search tree.	✓
AI.ML.6.a Contrast the unique characteristics of human learning with the ways machine learning systems operate to identify the limitations of machine learning.	✓
AI.ML.6.b Illustrate the structure of a neural network to describe how its parts form a set of functions that compute an output.	✓
AI.NI.6.a Individually and collaboratively compare language processing algorithms to solve a problem based on a given criteria (e.g., time, resource, accessibility).	✓
AI.NI.6.b Identify and describe how computers mimic human behavior to better serve humans.	✓
AI.SI.6.a Identify and explain how humans have control in curating training datasets to identify bias in machine learning.	✓
AI.SI.6.b	✓

Identify and explain how algorithmic bias impacts artificial intelligence systems to prevent bias in future datasets.	
IC.Cu.6.a Identify the change that current technologies have on people's everyday activities to understand the impact within a society.	✓
IC.Cu.6.b Identify issues of bias and accessibility in the design of existing technologies to address equality and equity in society.	✓
IC.Cu.6.c Identify and explore careers related to the field of computer science.	✓
IC.SI.6.a Analyze and present beneficial and harmful effects of electronic communications to understand their impacts on interpersonal, global, economic, political, business and cultural interactions.	✓
IC.SLE.6.a Describe tradeoffs between allowing information to be public and keeping information private and secure to inform decision-making.	✓
IC.SLE.6.b Identify the social and economic implications of privacy in the context of safety, law or ethics to understand how privacy impacts these areas.	✓
IC.SLE.6.c Evaluate the development of new technologies in communication, entertainment and business to understand the impact.	✓
IC.SLE.6.d Provide appropriate credit when using resources or artifacts that are not our own.	✓
IC.SLE.6.e	✓

Differentiate between the appropriate and inappropriate content on the internet and identify unethical and illegal online behavior.	
CS.D.7.a Develop and implement a process to evaluate existing computing devices capabilities based on personal interaction with the device.	✓
CS.HS.7.a Evaluate hardware and software combinations used to accomplish a task.	✓
CS.T.7.a Use a systematic process to identify and evaluate the source of a routine computing problem. Select the best solution to solve the computing problem and communicate the solution to others.	✓
NI.N.7.a Explain the role of hardware components and diagram the infrastructure of networks and the internet (including cloud servers).	✓
NI.N.7.b Explain the protocols (i.e., rules) and why they are used to transmit data across networks and the internet.	✓
NI.C.7.a Identify and apply introductory methods of encryption to model the secure transmission of information.	✓
NI.C.7.b Describe the types of malware to show how malware affects information.	✓
NI.C.7.c Identify cybersecurity concerns and measures needed to protect electronic information.	✓
NI.IOT.7.a Explain the positive and negative impacts of IoT as it applies to daily life	✓

and create ways to mitigate the negative impacts on society.	
DA.DCS.7.a Compare and contrast digital data collection tools to make them more useful and reliable.	✓
DA.DCS.7.b Evaluate various file formats to understand data storage capabilities.	✓
DA.DCS.7.c Create a logical file structure to organize data to support individual and collaborative work.	✓
DA.VC.7.a Communicate relations between data sets to interpret results.	✓
DA.VC.7.b Create a spreadsheet utilizing formulas, functions and graphs to represent and analyze data.	✓
DA.IM.7.a Create and analyze models and simulations to accurately hypothesize a real-world situation.	✓
ATP.A.7.a Select and modify pseudocode for a multi-step process to solve a problem.	✓
ATP.VDR.7.a Use test cases to trace variable values to determine the result.	✓
ATP.CS.7.a Use and apply decisions and loops in a program to solve a problem.	✓
ATP.M.7.a Decompose problems into parts to facilitate the design, implementation and review of increasingly complex programs.	✓

ATP.PD.7.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.	✓
ATP.PD.7.b Test, trace and debug to refine code.	✓
ATP.PD.7.c Identify procedures that utilize parameters.	✓
AI.P.7.a Give examples of how intelligent agents combine information from multiple sensors to react to an input.	✓
AI.P.7.b Describe how edge detectors can be composed to form more complex feature detectors, e.g., for letters or shapes.	✓
AI.P.7.c Illustrate the concept of feature extraction from images by simulating an edge detector.	✓
AI.RR.7.a Compare several algorithms that could be used to solve a specific type of reasoning problem.	✓
AI.ML.7.a Model how unsupervised learning finds patterns in unlabeled data to identify how machine learning takes place.	✓
AI.ML.7.b Create a dataset for training a decision tree classifier or predictor to explore the impact that different feature encodings have on the decision tree.	♦
AI.NI.7.a	♦

Curate a dataset to train a language-processing algorithm to create a program that incorporates voice commands.	
AI.NI.7.b Identify the components of a chatbot and explain how each component contributes to the chatbot's human-like responses.	♦
AI.SI.7.a Identify and explain the effect training data has on the accuracy of an artificial intelligence system to uncover bias in training data.	♦
AI.SI.7.b Identify and explain the problems of classification in the supervised artificial intelligence context to create data sets that are inclusive and accurate.	♦
IC.Cu.7.a Compare current technologies from the present to the past to evaluate the effect on people's everyday activities.	✓
IC.Cu.7.b Evaluate various technologies to identify issues of bias and accessibility.	✓
IC.Cu.7.c Identify and explore careers related to the field of computer science.	✓
IC.Cu.7.d Explain how computing impacts innovation in other fields.	✓
IC.SI.7.a Analyze and present beneficial and harmful effects of electronic communications to understand their impacts on interpersonal, global, economic, political, business and cultural interactions.	✓
IC.SLE.7.a Describe tradeoffs between allowing information to be public and keeping	✓

information private and secure to inform decision-making.	
IC.SLE.7.b Identify the social and economic implications of privacy in the context of safety, law or ethics to understand how privacy impacts these areas.	✓
IC.SLE.7.c Evaluate the development of new technologies in communication, entertainment and business to understand the impact.	✓
IC.SLE.7.d Provide appropriate credit when using resources or artifacts that are not our own.	✓
IC.SLE.7.e Explain the connection between the longevity of data on the internet, personal online identity and personal privacy.	✓
CS.D.8.a Evaluate the advantages and limitations of existing computing devices to recommend design improvements based on analysis of how users interact with the device.	✓
CS.HS.8.a Design projects that combine hardware and software components that could complete a task.	✓
CS.T.8.a Use a systematic process to identify and evaluate the source of a routine computing problem. Select the best solution to solve the computing problem and communicate the solution to others.	✓
NI.N.8.a Model the role of hardware components to diagram the infrastructure of networks and the internet (including cloud servers).	✓

NI.N.8.b Model protocols (i.e., rules) and explain why they are used to transmit data across networks and the internet.	✓
NI.N.8.c Explain how a system responds when information is lost to understand the effect it has on the transferred information.	✓
NI.C.8.a Explain how physical and digital security measures are used to protect electronic information.	✓
NI.C.8.b Compare and contrast the effects of different types of malware to determine strategies for how to protect devices.	✓
NI.C.8.c Compare and contrast examples of various threat actors, such as nation-states, cyber terrorist groups, organized crime or hacktivists.	♦
NI.C.8.d Explore and differentiate examples of complex encryption methods, e.g., Vigenère, Bacon's cipher and Enigma.	
NI.IOT.8.a Explore career pathways related to IoT to identify careers associated with the computer science field.	✓
NI.IOT.8.b Model the lifecycle of information in the IoT including data gathering, transmission, reception and analysis to recreate a real-world scenario.	♦
DA.DCS.8.a Interpret digital data collection tools to manage information effectively.	✓
DA.DCS.8.b	✓

Identify data storage systems to define how data is stored and accessed.	
DA.DCS.8.c Create a logical file structure to organize data in different storage systems to support individual and collaborative work.	✓
DA.VC.8.a Evaluate data to construct a model or representation.	✓
DA.VC.8.b Create a spreadsheet utilizing formulas, functions and graphs to represent and analyze data.	✓
DA.IM.8.a Create and analyze models and simulations to accurately hypothesize a real-world situation.	✓
ATP.A.8.a Create multiple pseudocode to solve a multi-step process and justify the most efficient solution.	✓
ATP.VDR.8.a Analyze test cases and determine the range of valid solutions.	✓
ATP.VDR.8.b Use a data structure to represent a collection.	✓
ATP.CS.8.a Use and apply decisions and loops in a program to solve a problem.	✓
ATP.M.8.a Decompose problems and subproblems into parts to facilitate the design, implementation and review of complex programs.	✓
ATP.PD.8.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.	✓

ATP.PD.8.b Systematically test and refine programs using a range of test cases.	✓
ATP.PD.8.c Use procedures that utilize parameters to pass values.	✓
AI.P.8.a Explain how sounds and images are represented digitally in a computer to explain how sensor data is stored in a computer.	✓
AI.P.8.b Describe how a vision system might exhibit cultural bias if it lacked knowledge of objects not found in the culture of the people who created it to create inclusive and equitable data sets.	♦
AI.P.8.c Illustrate how sequences of words can be recognized as phrases, even if some of the words are unclear, by looking at how the words fit together to create a text recognition program.	♦
AI.RR.8.a Model the process of solving a graph-search problem using breadth-first search to draw a search tree.	♦
AI.ML.8.a Explain the difference between training and using a reasoning model to identify how a machine learns.	♦
AI.ML.8.b Illustrate how objects in an image can be segmented and labeled to construct a training set for object recognition.	♦
AI.ML.8.c Explain how the choice of training data shapes the behavior of the classifier to identify how bias can be introduced if the training set is not properly balanced.	♦

AI.NI.8.a Create a program, individually and collaboratively, that implements a language processing algorithm to create a functional chatbot.	♦
AI.NI.8.b Critically analyze and discuss features that make an entity “intelligent,” including discussing differences between human, animal and machine intelligence to identify how machine intelligence varies from natural intelligence.	✓
AI.SI.8.a Identify and explain how the composition of training data affects the outcome of a supervised artificial intelligence system to identify bias in data sets.	♦
AI.SI.8.b Identify bias potential in the design of artificial intelligence systems and describe how to utilize inclusive AI design to prevent algorithmic bias.	♦
IC.Cu.8.a Compare current technologies and how they affect the current economy.	✓
IC.Cu.8.b Propose potential guidelines/standards/criteria to positively impact bias and accessibility in the design of future technologies.	✓
IC.Cu.8.c Identify and explore careers related to the field of computer science.	✓
IC.Cu.8.d Explain how computing impacts innovation in other fields.	✓
IC.SI.8.a Evaluate the impacts of electronic communication on personal relationships to be able to evaluate differences between face-to-face and electronic communication.	✓

IC.SLE.8.a Explain user privacy concerns related to the collection and generation of data that may not be evident through automated processes.	✓
IC.SLE.8.b Describe the social and economic implications of privacy in the context of safety, law or ethics to be global digital citizens.	✓
IC.SLE.8.c Identify ethical and legal security measures used to protect electronic information.	✓
IC.SLE.8.d Provide appropriate credit when using resources or artifacts that are not our own.	✓
CS.D.9–12.F.a Identify different multifunctional computing devices and connection technologies, both virtual and physical, to describe their purpose.	✓
CS.D.9–12.F.b Develop and apply criteria to evaluate computing systems for a given purpose.	✓
CS.D.9–12.F.c Create an artifact to demonstrate the roles and interactions of computing systems embedded in everyday objects.	✓
CS.HS.9–12.F.a Compare and contrast interactions between application software, system software and hardware.	✓
CS.T.9–12.F.a Apply a systemic process to identify problems and take steps to correct them within an integrated computing system.	✓

CS.T.9-12.F.b Analyze an IT device to determine either what repairs are needed or how to build it.	♦
NI.N.9-12.F.a Evaluate and select networking devices to establish scalable communications.	✓
NI.N.9-12.F.b Evaluate and select networking protocols to establish network communication.	✓
NI.N.9-12.F.c Understand scalability and reliability of networks to describe the relationships and effects of how the different types of networks work together.	✓
NI.C.9-12.F.a Examine and employ principles of cybersecurity.	✓
NI.C.9-12.F.b Identify physical, social and digital security risks to address possible attacks.	✓
DA.DCS.9-12.F.a Analyze patterns in a real-world data store through hypothesis, testing and use of data tools to gain insight and knowledge.	✓
DA.DCS.9-12.F.b Investigate data storage systems to compare and contrast how data is stored and accessed.	✓
DA.VC.9-12.F.a Analyze the benefits and limitations of data visualization or multisensory artifacts and tools to communicate which is most appropriate to solve a real-world problem.	✓

DA.IM.9–12.F.a Evaluate a model by creating a hypothesis, testing it and refining it to discover connections and trends in the data.	✓
ATP.A.9–12.F.a Define and use appropriate problem solving strategies and visual artifacts to create and refine a solution to a real-world problem.	✓
ATP.A.9–12.F.b Define and implement an algorithm by decomposing problem requirements from a problem statement to solve a problem.	✓
ATP.VDR.9–12.F.a Identify types of variables and data and utilize them to create a computer program that stores data in appropriate ways.	✓
ATP.CS.9–12.F.a Define control structures and Boolean logic and use them to solve real-world scenarios.	✓
ATP.CS.9–12.F.b Use appropriate syntax to create and use a method.	✓
ATP.CS.9–12.F.c Use data scoping to isolate data.	✓
ATP.M.9–12.F.a Break down a solution into procedures using systematic analysis and design.	✓
Equivalent to: ATP.A.9–12.F.b Define and implement an algorithm by decomposing problem requirements from a problem statement to solve a problem.	✓
ATP.M.9–12.F.b Create computational artifacts by systematically organizing,	✓

manipulating and/or processing data.	
ATP.VDR.9–12.A.a Utilize different data storage structures to store larger and more complex data than variables can contain.	✓
ATP.VDR.9–12.A.b Identify the appropriate data structures or variables to use to design a solution to a complex problem.	✓
ATP.PD.9–12.F.a Investigate software development methodologies to select the appropriate one for a project to complete as a team.	♦
ATP.PD.9–12.F.b Compare test methodologies to evaluate why each is used and to determine their benefits and costs.	♦
ATP.PD.9–12.F.c Correctly use consistent naming conventions, version control and comments to demonstrate why these are important for future use, maintenance and reuse of code.	✓
IC.Cu.9–12.F.a Analyze new technology to predict realistic impacts on society.	✓
IC.Cu.9–12.F.b Explore other professions to understand how computing has and will impact them positively and negatively.	✓
IC.SI.9–12.F.a Evaluate tools to increase connectivity of people in different cultures and career fields.	✓
IC.SI.9–12.F.b Analyze the collection and generation of data through automated	✓

processes to explain the privacy concerns that are not always evident to users.	
IC.SLE.9–12.F.a Interpret and analyze breaches in privacy and security to investigate the legal and ethical impact.	✓
IC.SLE.9–12.F.b Analyze the concepts of usability and security to explain typical tradeoffs between them.	✓
IC.SLE.9–12.F.c Analyze the collection and generation of data through automated processes to explain the legal concerns that are not always evident to users.	✓
IC.SLE.9–12.F.d Explain the beneficial and harmful effects of intellectual property laws to determine the impacts on innovation.	✓
CS.D.9–12.A.a Evaluate the function of various devices to formulate a human interaction solution.	✓
CS.D.9–12.A.b Integrate multifunctional computing devices to solve a problem.	✓
CS.D.9–12.A.c Identify the functionality of various categories of hardware components and the communication between them, and use that information to build a system virtually or physically for a specific task.	✓
CS.HS.9–12.A.a Categorize types of operating systems and how they will be used.	✓
CS.T.9–12.A.a	✓

Evaluate and revise a systematic process to identify the source of a problem and the steps to correct it within individual and connected devices.	
NI.N.9-12.A.a Construct a networking devices map solution for a real-world scenario to establish communication between distant devices.	♦
NI.N.9-12.A.b Develop a solution to a real-world scenario using networking protocols to establish network communication.	✓
NI.N.9-12.A.c Improve scalability and reliability of networks to describe the relationships and effects of how the different types of networks work together.	✓
NI.C.9-12.A.a Identify cybersecurity ethics and law.	✓
NI.C.9-12.A.b Implement a devised solution to counter a security threat.	✓
DA.DCS.9-12.A.a Create multidimensional data collections that can be utilized through various methods to solve complex data problems.	✓
DA.DCS.9-12.A.b Investigate data storage and collection tools to analyze tradeoffs and limitations.	✓
DA.VC.9-12.A.a Create visualization or multisensory artifacts to communicate insights and knowledge gained from complex data analysis that answers real-world questions.	✓
DA.IM.9-12.A.a	✓

Create a model that simulates a complex system and uses extracted data to hypothesize, test and refine the model to discover connections or trends.	
ATP.A.9-12.A.a Define and explain recursive algorithms to understand how and when to apply them.	✓
ATP.A.9-12.A.b Use recursion to effectively solve problems.	✓
ATP.A.9-12.A.c Define and explain sorting and searching algorithms to understand how and when to apply them.	✓
ATP.A.9-12.A.d Use sorting and searching to analyze and organize data.	✓
ATP.VDR.9-12.A.a Utilize different data storage structures to store larger and more complex data than variables can contain.	✓
ATP.VDR.9-12.A.b Identify the appropriate data structures or variables to use to design a solution to a complex problem.	✓
ATP.CS.9-12.A.a Write programs that use library methods and control structures and methods to solve a problem.	✓
ATP.CS.9-12.A.b Refactor a program to be smaller and more efficient.	✓
ATP.M.9-12.A.a Construct solutions to problems using student-created components (e.g., procedures, modules, objects).	✓

Equivalent to: ATP.CS.9–12.F.b Use appropriate syntax to create and use a method.	✓
ATP.M.9–12.A.b Design or redesign a solution to a large-scale computational problem by identifying generalizable patterns.	✓
Equivalent to: ATP.PD.9–12.A.a Fully implement the most appropriate software methodology to complete a team programming project.	✓
ATP.M.9–12.A.c Create programming solutions by reusing existing code (e.g., libraries, Application Programming Interface (APIs), code repositories).	✓
Equivalent to: ATP.CS.9–12.A.a Write programs that use library functions, methods and control structures to solve a problem.	✓
ATP.PD.9–12.A.a Fully implement the most appropriate software methodology to complete a team programming project.	✓
IC.Cu.9–12.A.a Evaluate an alternative solution where a current tool does not exist due to limited resources.	✓
IC.Cu.9–12.A.b Analyze the equity, access and influence of the distribution of computing resources to see their global impact.	✓
IC.Cu.9–12.A.c Design a study to predict how computers will revolutionize an aspect of our culture.	♦
IC.SLE.9–12.A.a	✓

Create a scenario to demonstrate typical tradeoffs between usability and security and recommend security measures based on these or other tradeoffs.	
IC.SLE.9-12.A.b Investigate intellectual property laws, including copyright, trademarks and patents, to identify some of the practical, business and ethical impacts.	✓