

Ohio CS Standards Alignment with CodeX Curriculum

	Unit 1	Unit 2	Unit 3
Computer Systems			
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.	[1]		
Networks and the Internet			
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.			
Data and Analysis			
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.			
Algorithmic Thinking and Programming			
ATPA.5.a Evaluate a multi-step process to diagram the proper steps to solve a problem.	[2]		
ATPVDR.5.a Create a variable, a placeholder for storing a value, to understand how it is used in a multistep process (i.e., algorithm).	[3]		
ATPCS.5.a Create a program using sequences, events, loops and conditionals to solve a problem.	[4]		
ATPM.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.	[5]		
ATPM.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.	[6]		
ATPPD.5.a Use a design process to plan and develop a program that includes multiple steps and end user preferences.		[7]	
ATPPD.5.b Using guided questions, work through a program to identify errors and discuss possible solutions to repair the program.	[8]		
Impacts of Computing			
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	[9]		
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.			

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Computer Systems			
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	[10]		
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	[11]		
Networks and the Internet			
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.			
Data and Analysis			
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.			
Algorithmic Thinking and Programming			
ATPA.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.	[12]		
ATP.VDR.6.b Create variables and use them within a multi-step process.	[13]		
ATPCS.6.a Identify and trace decisions and loops that exist in a multi-step process within a program.	[14]		
ATPM.6.a Decompose problems into parts to facilitate the design, implementation and review of programs.	[15]		
ATPPD.6.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.	[16]		
ATPPD.6.b Test and trace to debug and refine code.	[17]		
Impacts of Computing			
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.			

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Computer Systems			
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.	[18]		
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.	[19]		
Networks and the Internet			
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.			
Data and Analysis			
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.			
Algorithmic Thinking and Programming			
ATPA.7.a Select and modify pseudocode for a multi-step process to solve a problem.	[20]		
ATP.VDR.7.a Use test cases to trace variable values to determine the result.	[21]		
ATP.CS.7.a Use and apply decisions and loops in a program to solve a problem.	[22]		
ATP.M.7.a Decompose problems into parts to facilitate the design, implementation and review of increasingly complex programs.	[23]		
ATP.PD.7.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.	[24]		
ATP.PD.7.b Test, trace and debug to refine code.	[25]		
ATP.PD.7.c Identify procedures that utilize parameters.			
Impacts of Computing			
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.			

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Computer Systems			
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.	[26]		
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.	[27]		
Networks and the Internet			
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.			
Data and Analysis			
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.			
Algorithmic Thinking and Programming			
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.	[28]		
ATP.M.8.a Decompose problems and subproblems into parts to facilitate the design, implementation and review of complex programs.	[29]		
ATP.PD.8.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.	[30]		
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.		[31]	
Impacts of Computing			
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.			

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Computer Systems			
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.	[32]		
CS.T.9-12.F.b Analyze an IT device to determine either what repairs are needed or how to build it.			
Networks and the Internet			
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.			
Data and Analysis			
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.DCS.9-12.F.b Investigate data storage systems to compare and contrast how data is stored and accessed.			
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.			
Algorithmic Thinking and Programming			
ATP.A.9-12.F.a Define and use appropriate problem solving strategies and visual artifacts to create and refine a solution to a realworld problem.	[33]		
ATP.A.9-12.F.b Define and implement an algorithm by decomposing problem requirements from a problem statement to solve a problem.	[34]		
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.	[35]		
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.	[36]		
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.		[37]	
ATP.M.9-12.F.b Create computational artifacts by systematically organizing, manipulating and/or processing data.			
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.	[38]		
Impacts of Computing			
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.			

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Computer Systems			
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.			
Networks and the Internet			
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.			
Data and Analysis			
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			
Algorithmic Thinking and Programming			
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.	[39]		
ATP.CS.9-12.A.b Refactor a program to be smaller and more efficient.	[40]		
ATP.M.9-12.A.a Construct solutions to problems using student-created components (e.g., procedures, modules, objects).	[41]		
ATP.M.9-12.A.b Design or redesign a solution to a large-scale computational problem by identifying generalizable patterns.			
ATP.M.9-12.A.c Create programming solutions by reusing existing code (e.g., libraries, Application Programming Interface (APIs), code repositories).	[42]		
ATP.PD.9-12.A.a Fully implement the most appropriate software methodology to complete a team programming project.			
Impacts of Computing			
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.			

- [1] Mission 2 and the teachers' manual discuss troubleshooting techniques
Code Tracing Charts can be a way to track errors and how to fix them which are also introduced in the teachers' manual
- [2] All missions and remixes are multi step processes
- [3] 3.8 introduces the use of variables
- [4] These begin in Mission 4
- [5] Pseudocodes are introduced in the teachers' manual
- [6] Remixes are introduced in Mission 4
- [7] These could be the remixes depending on the rubric the teacher gives
- [8] 3.5 introduces the debugger
- [9] These are the remixes that begin in Mission 4
- [10] The discussion of this begins in Mission 2
Every time a new part of the hardware or a sensor is introduced, the connection between the software and hardware is taught.
- [11] Mission 2 and the teachers' manual discuss troubleshooting techniques
Code Tracing Charts can be a way to track errors and how to fix them which are also introduced in the teachers' manual
- [12] 3.8 begins the use of variables and discusses when you should use them
All missions after that utilize variables
- [13] 3.8 begins the use of variables and discusses when you should use them
All missions after that utilize variables
- [14] Flowcharts would allow you to identify and trace the code
These are introduced in the teachers' manual
- [15] Code Tracing Charts are introduced in the teachers' manual and these can be utilized to accomplish this objective
- [16] All missions do this
- [17] 3.5 introduces the debugger
- [18] The discussion of this begins in Mission 2
Every time a new part of the hardware or a sensor is introduced, the connection between the software and hardware is taught.
- [19] Mission 2 and the teachers' manual discuss troubleshooting techniques
Code Tracing Charts can be a way to track errors and how to fix them which are also introduced in the teachers' manual
- [20] These are introduced in the teachers' manual and our instructions to our missions are sort of like pseudocodes and explaining the multiple steps needed to be coded.
- [21] Flowcharts would allow you to identify and trace the code
These are introduced in the teachers' manual

The debugger does this also and it is introduced in 3.8

[22] These begin in Mission 4

[23] Code Tracing Charts are introduced in the teachers' manual and these can be utilized to accomplish this objective

[24] All missions do this

[25] 3.5 introduces the debugger

[26] All Missions use a combination of hardware and software to complete tasks

[27] Mission 2 and the teachers' manual discuss troubleshooting techniques
Code Tracing Charts can be a way to track errors and how to fix them which are also introduced in the teachers' manual

[28] All Missions beginning in mission 3 utilize an infinite while loop
Different types of loops are introduced in 6.4

[29] Code Tracing Charts are introduced in the teachers' manual and these can be utilized to accomplish this objective

[30] The remixes allow for creative expression and they begin in Mission 4 and they also utilize algorithms, variables and control structures.

[31] 9.5 begins the use of parameters and arguments

[32] Mission 2 and the teachers' manual discuss troubleshooting techniques
Code Tracing Charts can be a way to track errors and how to fix them which are also introduced in the teachers' manual

[33] These are the remixes depending on the rubric the teacher uses

[34] This begins in Mission 4

[35] Mission 4 introduces data types
3.8 introduces the use of variables
7.5 begins the use of lists

[36] Correct syntax is discussed any time a new technique is introduced

[37] Code Tracing Charts are introduced in the teachers' manual and these can be utilized to accomplish this objective

[38] 5.5 introduces the use of comments and descriptive naming of variables
7.6 & 10.6 discuss readability and maintenance of codes for reuse

[39] All missions use libraries and every time a new one is introduced it is explained.

[40] This begins when loops are introduced so that you do not have to type the code multiple times

[41] These are the remixes that begin in Mission 4

[42] All missions use libraries and every time a new one is introduced it is explained.