App Development/Coding Unit #1: Commands Sequences, and Functions

Content Area: **Vocational**
Course(s): **Coding / App Development**
Time Period: **First Marking Period**
Length: **12 Weeks**
Status: **Published**

Unit Overview

The unit discusses key coding concepts while demonstrating how coding is a way of thinking that can be applied to other subjects and everyday life.

STAGE 1- DESIRED RESULTS

Educational Standards

2016 New Jersey Student Learning Standards- 21st Century Life and Careers

The 12 Career Ready Practices

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

9.2 Career Awareness, Exploration, and Preparation

CAEP.9.2.8.B.1	Research careers within the 16 Career Clusters ® and determine attributes of career success.
CAEP.9.2.8.B.2	Develop a Personalized Student Learning Plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
CAEP.9.2.8.B.4	Evaluate how traditional and nontraditional careers have evolved regionally, nationally, and globally.
CAEP.9.2.8.B.5	Analyze labor market trends using state and federal labor market information and other resources available online.
CAEP.9.2.8.B.6	Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.
CAEP.9.2.8.B.7	Evaluate the impact of online activities and social media on employer decisions.

2016 New Jersey Student Learning Standards- Technology

8.1 Educational Technology

Strand A: Technology Operations and Concepts

TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.2	Create a document (e.g., newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
TECH.8.1.8.A.3	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
TECH.8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results.
TECH.8.1.8.A.5	Create a database query, sort and create a report and describe the process, and explain the report results.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.

Strand B: Creativity and Innovation

TECH.8.1.8.B.1	Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).

TECH.8.1.8.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.8.B.CS2	Create original works as a means of personal or group expression.

Strand C: Communication and Collaboration

TECH.8.1.8.C.1	Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries.
TECH.8.1.8.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.8.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.8.C.CS3	Develop cultural understanding and global awareness by engaging with learners of other cultures.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.

Strand D: Digital Citizenship

TECH.8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
TECH.8.1.8.D.2	Demonstrate the application of appropriate citations to digital content.
TECH.8.1.8.D.3	Demonstrate an understanding of fair use and Creative Commons to intellectual property.
TECH.8.1.8.D.4	Assess the credibility and accuracy of digital content.
TECH.8.1.8.D.5	Understand appropriate uses for social media and the negative consequences of misuse.
TECH.8.1.8.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.8.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.

Strand E: Research and Information Fluency

TECH.8.1.8.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
TECH.8.1.8.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.8.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.8.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.1.8.E.CS4	Process data and report results.

Strand F: Critical thinking, problem solving, and decision making

TECH.8.1.8.F.1	Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.

TECH.8.1.8.F.CS1	Identify and define authentic problems and significant questions for investigation.
TECH.8.1.8.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.8.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.8.F.CS4	Use multiple processes and diverse perspectives to explore alternative.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming

Strand A: The Nature of Technology: Creativity and Innovation

TECH.8.2.8.A.1	Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e., telephone for communication - smart phone for mobility needs).
TECH.8.2.8.A.2	Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system.
TECH.8.2.8.A.3	Investigate a malfunction in any part of a system and identify its impacts.
TECH.8.2.8.A.4	Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.
TECH.8.2.8.A.5	Describe how resources such as material, energy, information, time, tools, people, and capital contribute to a technological product or system.
TECH.8.2.8.A.CS1	The characteristics and scope of technology.
TECH.8.2.8.A.CS2	The core concepts of technology.
TECH.8.2.8.A.CS3	The relationships among technologies and the connections between technology and other fields of study.

Strand B: Technology and Society

TECH.8.2.8.B.1	Evaluate the history and impact of sustainability on the development of a designed product or system over time and present results to peers.
TECH.8.2.8.B.2	Identify the desired and undesired consequences from the use of a product or system.
TECH.8.2.8.B.3	Research and analyze the ethical issues of a product or system on the environment and report findings for review by peers and /or experts.
TECH.8.2.8.B.4	Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings.
TECH.8.2.8.B.5	Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries and societies.
TECH.8.2.8.B.6	Compare and contrast the different types of intellectual property including copyrights, patents and trademarks.
TECH.8.2.8.B.7	Analyze the historical impact of waste and demonstrate how a product is up cycled, reused or remanufactured into a new product.
TECH.8.2.8.B.CS1	The cultural, social, economic and political effects of technology.

TECH.8.2.8.B.CS2	The effects of technology on the environment.
TECH.8.2.8.B.CS3	The role of society in the development and use of technology.
TECH.8.2.8.B.CS4	The influence of technology on history.

Strand C: Design

TECH.8.2.8.C.1	Explain how different teams/groups can contribute to the overall design of a product.
TECH.8.2.8.C.2	Explain the need for optimization in a design process.
TECH.8.2.8.C.3	Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
TECH.8.2.8.C.4	Identify the steps in the design process that would be used to solve a designated problem.
TECH.8.2.8.C.6	Collaborate to examine a malfunctioning system and identify the step-by-step process used to troubleshoot, evaluate and test options to repair the product, presenting the better solution.
TECH.8.2.8.C.7	Collaborate with peers and experts in the field to research and develop a product using the design process, data analysis and trends, and maintain a design log with annotated sketches to record the developmental cycle.
TECH.8.2.8.C.8	Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.
TECH.8.2.8.C.5a	Explain the interdependence of a subsystem that operates as part of a system.
TECH.8.2.8.C.5b	Create a technical sketch of a product with materials and measurements labeled.
TECH.8.2.8.C.CS1	The attributes of design.
TECH.8.2.8.C.CS2	The application of engineering design.
TECH.8.2.8.C.CS3	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.

Strand D: Abilities for a Technological World

TECH.8.2.8.D.1	Design and create a product that addresses a real world problem using a design process under specific constraints.
TECH.8.2.8.D.2	Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.
TECH.8.2.8.D.3	Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.
TECH.8.2.8.D.4	Research and publish the steps for using and maintaining a product or system and incorporate diagrams or images throughout to enhance user comprehension.
TECH.8.2.8.D.5	Explain the impact of resource selection and the production process in the development of a common or technological product or system.
TECH.8.2.8.D.6	Identify and explain how the resources and processes used in the production of a current technological product can be modified to have a more positive impact on the environment.
TECH.8.2.8.D.CS1	Apply the design process.

TECH.8.2.8.D.CS2	Use and maintain technological products and systems.
TECH.8.2.8.D.CS3	Assess the impact of products and systems.

Strand E: Computational Thinking: Programming

TECH.8.2.8.E.1	Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.
TECH.8.2.8.E.2	Demonstrate an understanding of the relationship between hardware and software.
TECH.8.2.8.E.3	Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.
TECH.8.2.8.E.4	Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).
TECH.8.2.8.E.CS1	Computational thinking and computer programming as tools used in design and engineering.

Essential Questions

- What are commands?
- What are sequences?
- What is a bug in coding?
- What is debugging?
- What are functions?
- How can functions help you in coding?
- What are conditional code, Booleans, and logical operators?
- What are while loops and how do they improve your coding?

Enduring Understanding

- The use of commands and sequences is an essential tool in coding and creating Apps.
- Knowing how to debug the application and find a solution will help make the App successful.
- Finding patterns in code can make your coding have less steps.
- Using conditional code, Booleans, and logical operators allows for smarter code.
- Loops make it easy to repeat a command or a sequence of commands to accomplish a goal.
- An algorithm is a set of steps and rules that solve a problem.

Students will know...

- Describe what commands and sequences are.
- Demonstrate the use of commands and sequences in an everyday situation.
- Code using commands and sequences.
- Describe what debugging is.
- Demonstrate the use of debugging in an everyday situation.
- Debug with code.
- Describe what functions and for loops are.
- Demonstrate the use of functions and for loops in an everyday situation.
- Code using functions and for loops.
- Describe what conditional code, Booleans, and logical operators are.
- Demonstrate the use of conditional code, Booleans, and logical operators in an everyday situation.
- Code using conditional code, Booleans, and logical operators.
- Describe what while loops are.
- Code while using loops.
- Describe what algorithms are.
- Demonstrate the use of algorithms in an everyday situation.
- Code using algorithms.

Vocabulary:

Coding, Developers, Command, Sequence, Bug, Debugging, Function, For Loop, Condition, Conditional code, Boolean, Logical operator, Algorithm, Pseudocode

Students will be able to...

- Construct code using commands and sequences.
- Identify ways to be more efficient in coding.
- Recognize that a function is a collection of commands grouped together and given a name.
- Recognize that a for loop runs a block of code over and over for a set number of times.
- Construct a for loop to replace repeated code.
- Recognize that a Boolean is a value that can only be either true or false.
- Recognize that a logical operator is a symbol or words like “and”, “or”, and “not” that connects two or more Booleans to make conditional decisions more specific.
- Construct conditional code that will determine when to take an action and when to change course.
- Create a while loop so the code only runs while the given condition is true.
- Construct an algorithm to solve problems.
- Connect previously learned techniques including functions, for loops, while loops, conditionals, and algorithms to solve problems.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment Suggestions

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry

- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments Suggestions

- Story activity: Visual stories (complete questions)
- Activities in Swift Playgrounds solving puzzles using code.
- Written reflections on how the code they wrote solved the puzzle.
- Activity: Selfie Time, Hide and Seek, Debug Like a Pro, Create a pattern, Scavenger Hunt, Hide and Seek Again, Who is the Tallest?,
- Swift Playgrounds for activities (student run)
- Class discussion/reflection
- Journal entries

Benchmark Assessments

STAGE 3- LEARNING PLAN

Instructional Map

Modifications/Differentiation of Instruction

Modification Strategies

- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice
- Shortened Assignments
- Teacher Notes
- Tutorials
- Use of Additional Reference Material
- Use of Audio Resources

High Preparation Differentiation

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Menu Assignments
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers

- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

Low Preparation Differentiation

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills
- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

Vertical Integration- Discipline Mapping

Additional Materials