JavaScript Control Structures

Content Area: **Math**
Course(s): **Introduction to Computer Science**
Time Period: **Marking Period 2**
Length: **4 - 5 Weeks**
Status: **Published**

Unit Overview

This unit teaches students the about several different types of control structures. This includes the difference between them and how to use them properly in a program.

Enduring Understandings

Objectives/ Topics Covered

- Booleans
- For Loops
- Conditionals
- Nested Control Structures
- While Loops
- Solving large and more complex problems using control structures

Essential Questions

- How do you determine which control structure is most appropriate in a program?
- How can we use multiple control structures within a single program?

New Jersey Student Learning Standards (No CCS)

8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices.

8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.

8.1.8.AP.3: Design and iteratively develop programs that combine control structures, including nested loops

and compound conditionals.

8.1.8.AP.4: Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.

8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.

8.1.8.AP.7: Design programs, incorporating existing code, media, and libraries, and give attribution.

8.1.8.AP.8: Systematically test and refine programs using a range of test cases and users.

8.1.8.AP.9: Document programs in order to make them easier to follow, test, and debug.

Technology Standards

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.2	Apply previous content knowledge by creating and piloting a digital learning game or tutorial.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.2.12.C.CS1	The attributes of design.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).
TECH.8.2.12.E.CS1	Computational thinking and computer programming as tools used in design and engineering.

21st Century Themes/Careers

CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.

Instructional Strategies & Learning Activities

22 control structures programming exercises in total

● Using comparison and logical operators to control the flow of the program

○ Example Exercise: Inventory Write a program that keeps track of a simple inventory for a store. While there are still items left in the inventory, ask the user how many items they would like to buy. Then print out how many are left in inventory after the purchase. You should use a while loop for this problem. Make sure you catch the case where the user tries to buy more items than there are in the inventory. In that case, you should print a message to the user saying that their request isn't possible.

● Using for loops

○ Example Exercise: All Dice Values

■ Write a program that prints all possible dice rolls with 2 dice. To do so, you should use a double for loop. Hint: You can't use i for both for loops.

● Drawing basic graphics using JavaScript ○ Example Exercise: Caterpillar This graphics program should draw a caterpillar. A caterpillar has NUM_CIRCLES circles. Every other circle is a different color, the even circles are red, and the odd circles are green (by even we mean when i is an even number). Use a for loop to draw the caterpillar, centered vertically in the screen. Also, be sure that the caterpillar is still drawn across the whole canvas even if the value of NUM_CIRCLES is changed. Unit 6: Control Structures Challenges (1 week, 5 hours) Browse the full content of this unit at https://codehs.com/library/course/1

● 4 challenges using control structures to tie everything learned in the JavaScript Control Structures module together

○ Example Exercise: Guessing Game The computer picks a number between 1 and 100, and you have to guess it. The computer will tell you whether your guess was too high, too low, or correct. Your assignment is to generate a random number and let the user guess numbers until they guess the correct number. Make sure to let the user know what they should do at the beginning of the program!

Formative Assessments

Quick Friday Quizzes - (2- 3 MC / Short answer questions as well as a programming task).

Summative Assessment

End of Unit Code HS MC Test

Programming Task

Alternate Assessments

Extension exercies and Challenges