### **Javascript: Loops and Arrays**

### **Duration: 1.5 Weeks**

### **Summary**

This lesson uses the Khan material to teach the student to read and write FOR and WHILE loops in Javascript. It also teaches about the array data structure. The student uses a FOR loop to traverse arrays. The student also uses nested loops. The assignment has the student use loops and nested loops to draw repetitive shapes including rain drops in a rainstorm and repeated windows on a house.

### **Learning Objectives**

* Develop an algorithm for implementation in a program. [AP CSP P2, 4.1.1]
* Develop a correct program to solve problems. [AP CSP P2, LO 5.1.2]
* Explain what a *while* loop is including the three parts: what to do over and over, what to change, and how to stop.
* Program while loops in Khan Javascript.
* Program to insert an image into a Khan Javascript program.
* Explain the syntax of a *for* loop in Khan Javascript including its three parts in the beginning of the loop: start, how long to run the loop, and what to change in the loop.
* Program with a for loop in Khan Javascript.
* Explain the similarities of while loops and for loops, and explain why you would use one or the other.
* Explain what nested loops are including the terms *inner loop* and *outer loop*.
* Program in Khan Javascript with nested loops.
* Explain what an *array* is.
* Explain that zero is the first index of arrays.
* Program Khan Javascript using arrays.
* Program Khan Javascript using the *.length* property of arrays.
* Explain how to loop and do something with all elements in an array.
* Program looping through an array in Khan Javascript.
* Explain how to modify arrays by adding elements.
* Program modifying arrays in Khan Javascript using the *.push* method.
* Employ appropriate mathematical and logical concepts in programming, such as forming logical boolean expressions. [AP CSP P1, LO 5.5.1]

### **Course Material**

Sign in to Khan Academy before completing the following tutorials.

Complete the following Videos and Exercises, in order. You will earn points for completing the exercises labeled "Do". You must be signed in to Khan Academy to have it show that you completed these modules. The assignment requires that you show this.

**Looping**

* Watch: [Intro to While Loops](https://www.khanacademy.org/computing/cs/programming/looping/p/intro-to-while-loops) [4:45]
* Do: [While Loops Exercise](https://www.khanacademy.org/computing/computer-programming/programming/looping/e/review-loops)
* Do: [A Loopy Ruler](https://www.khanacademy.org/computing/computer-programming/programming/looping/p/challenge-a-loopy-ruler)
* Watch: [More While Loops: Balloon Hopper](https://www.khanacademy.org/computing/computer-programming/programming/looping/p/more-while-loops-balloon-hopper) [5:30]
* Do: [A Loopy Landscape](https://www.khanacademy.org/computing/computer-programming/programming/looping/p/challenge-a-loopy-landscape)
* Watch: [For Loops! A New Kind of Loop](https://www.khanacademy.org/computing/computer-programming/programming/looping/p/for-loops-a-new-kind-of-loop) [6:06]
* Do: [Lined Paper](https://www.khanacademy.org/computing/computer-programming/programming/looping/p/challenge-lined-paper)
* Watch: [Nested For Loops](https://www.khanacademy.org/computing/computer-programming/programming/looping/p/nested-for-loops) [5:58]
* Read: [Review Loops](https://www.khanacademy.org/computing/cs/programming/looping/a/review-looping)

**Arrays**

* Watch: [Intro to Arrays](https://www.khanacademy.org/computing/computer-programming/programming/arrays/p/intro-to-arrays) [4:59]
* Do: [Favorite Fruits](https://www.khanacademy.org/computing/computer-programming/programming/arrays/p/challenge-favorite-fruits)
* Watch: [Looping Through Arrays](https://www.khanacademy.org/computing/computer-programming/programming/arrays/p/looping-through-arrays) [5:21]
* Do: [Favorite Animals](https://www.khanacademy.org/computing/computer-programming/programming/arrays/p/challenge-favorite-animals)
* Watch: [Modifying Arrays](https://www.khanacademy.org/computing/computer-programming/programming/arrays/p/modifying-arrays) [5:50]
* Do: [Constellation Maker](https://www.khanacademy.org/computing/computer-programming/programming/arrays/p/challenge-constellation-maker)
* Read: [Review: Arrays](https://www.khanacademy.org/computing/computer-programming/programming/arrays/a/review-arrays)

### **Assessments**

* Conceptual Quiz:
  + [Loops and Arrays](https://docs.google.com/document/d/1Aqucbl133LfckOox01jHYeZ1zf97YOinj8NQTFWoOO4/edit?usp=sharing) (requires access)
* Practical Assignment:
  + [Javascript: Loops and Arrays](https://drive.google.com/open?id=15Wz9ObeUUjmGWWk_kFatnYiHb0YHpixUX5khXmInW-8) | [Grading Rubric](https://drive.google.com/open?id=1zti-2rjeINCJu8x7huHYaf0QPB94GU6pJxNVp7uBKec) | [Answer Key](https://docs.google.com/a/my.uri.edu/document/d/1muwSyVx5TxTaUsl9q5eF-_froc-BZ2inxDrexeiY5qk/edit?usp=sharing)