### **Javascript: Introduction**

### **Duration: 1 Week**

### **Summary**

This lesson introduces the Programming Big Idea from AP Computer Science Principles. It teaches programming in Javascript using material from the Khan Academy. Students program fun graphics and games. The Khan material uses short engaging videos to explain and demonstrate programming. The videos are intermixed with guided exercises done on Khan's website with code entered into one pane and results showing in another pane. The assignment has them create a creature of their choosing using drawing commands.

### **Learning Objectives**

* Use Javascript to draw shapes and color them.
* Explain the pixel coordinate (X,Y) system used for drawing in Khan Javascript.
* Explain the notion of parameters and parameter passing using the rect and ellispe functions in Khan Javascript.
* Explain the notion of exact syntax in Khan e.g. that commands must be spelled correctly and end with a semicolon.
* Explain what a function is in Khan Javascript.
* Explain the notion of order of shapes on the drawing and its relation to the order of function calls in the program.
* Explain the parameters for coloring with Red, Green, Blue in Khan Javascript.
* Explain the line color (stroke) and the fill color (fill) in Khan Javascript.
* Explain pseudocode and how to use it to design programs and express algorithms.
* Identify multi levels of abstraction in a program by explaining how high-level languages are mapped to binary data that executes on hardware. [AP CSP P3, LO 2.2.3]
* Express an algorithm in natural language, pseudocode, and a programming language. [AP CSP P5, LO 4.1.2]
* Explain how programs implement algorithms. [AP CSP P2, LO 5.2.1]
* Develop a program for creative expression. [AP CSP P2, LO 5.1.1]
* Evaluate the correctness of a program. [AP CSP P4, LO 5.4.1]

### **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.

**Intro to Programming**

* Watch: [What is Programming?](https://www.khanacademy.org/computing/computer-programming/programming/intro-to-programming/v/programming-intro) [2:00]
* Watch: [Learning Programming on Khan Academy](https://www.khanacademy.org/computing/computer-programming/programming/intro-to-programming/a/learning-programming-on-khan-academy) [7:08]

**Drawing Basics**

* Watch: [Making Drawings with Code](https://www.khanacademy.org/computing/computer-programming/programming/drawing-basics/p/making-drawings-with-code) [6:08]
* Read: [Tip - Number Scrubbing](https://www.khanacademy.org/computing/computer-programming/programming/drawing-basics/a/quick-tip-number-scrubbing)
* Do: [Challenge: Simple Snowman](https://www.khanacademy.org/computing/computer-programming/programming/drawing-basics/p/challenge-simple-snowman)
* Watch: [Drawing More Shapes with Code](https://www.khanacademy.org/computing/computer-programming/programming/drawing-basics/p/drawing-more-shapes-with-code) [5:51]
* Do: [Challenge: Waving Snowman](https://www.khanacademy.org/computing/computer-programming/programming/drawing-basics/p/challenge-waving-snowman)

**Coloring**

* Watch: [Coloring with Code](https://www.khanacademy.org/computing/computer-programming/programming/coloring/p/coloring-with-code) [4:58]
* Read: [Tip - Color Picking](https://www.khanacademy.org/computing/computer-programming/programming/coloring/a/quick-tip-color-picking)
* Do: [Challenge: Sunny Snowy Day](https://www.khanacademy.org/computing/computer-programming/programming/coloring/p/challenge-sunny-snowy-day)
* Watch: [The Power of Docs](https://www.khanacademy.org/computing/computer-programming/programming/coloring/v/the-power-of-the-docs) [6:09]

**Pseudocode and Clean Code**

* Watch: [Planning with Pseudocode](https://www.khanacademy.org/computing/computer-programming/programming/good-practices/p/planning-with-pseudo-code) [3:26]
* Watch: [Readable Code](https://www.khanacademy.org/computing/computer-programming/programming/writing-clean-code/p/readable-code) [3:59]
* Watch: [Clarifying with Comments](https://www.khanacademy.org/computing/computer-programming/programming/writing-clean-code/p/clarifying-with-comments) [5:44]
* Do: [Clean Code Exercise](https://www.khanacademy.org/computing/computer-programming/programming/writing-clean-code/e/quiz--clean-code)

### **In Class**

* Optional: [Programming Unplugged](http://csunplugged.org/programming-languages/)

### **Assessments**

* Conceptual Quiz:
  + [Javascript: Drawing](https://docs.google.com/document/d/1KiBojLBYkmkffSSSX1pX0qzwg1RsRYn6MwbjXPFVBBY/edit?usp=sharing) (requires access)
* Practical Assignment:
  + [Javascript: Drawing](https://drive.google.com/open?id=1j3qyaJrHwJbYOM7rmYa9AyOIOscOISc4CRK5lydMo4I) | [Grading Rubric](https://drive.google.com/open?id=1_WJkEWyjEN8YCsLHfi0jxvbqXq1XIBmYsjD99rHAQwY) | [Answer Key](https://docs.google.com/a/my.uri.edu/document/d/15zxklod99Q5g0yodj-sAe5EksFE2zABdVHORaLAcF38/edit?usp=sharing)