Unit 1: Drawing, Variables, Random

Essential question: How can code be used as a creative and expressive medium?

Grade: High school

Overview

In this unit students get acquainted with the p5 canvas coordinate system, drawing shapes and colors on it. Programming concepts covered include calling built-in p5 functions with different parameters, working with variables (both built-in and custom), and using controlled randomness.

Students are introduced to the p5 web editor and practice consulting the p5 online documentation. In the final project, students apply these skills to create an abstract album cover.

Blueprint Foundations Student Outcomes

Concept	**Practice**		
	Analyze	*Prototype*	*Communicate*
Abstraction	Give examples of specific patterns in something I can see, do or touch. Describe how I might use patterns to express an idea.	Describe different things I tried in order to achieve a goal. Explain why I chose to include the specific components of my prototype over others.	Explain how I might help others identify patterns. Explain why using patterns is necessary when creating with a computer.
Algorithms	Describe more than one set of instructions that might complete a task. Describe how instructions can have different outputs depending on inputs.	Explain why I used specific instructions to complete a task.	Compare and contrast my instructions with other instructions that complete the same task.
Programming	Experiment with the commands of a programming language Describe three ways a development	Explain why I chose specific commands to communicate my instructions. Describe the changes I	Discuss what can and cannot be done with a specific set of commands. Teach another person

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	environment helps me create a project. Describe tools and processes needed to collaborate on programming projects.	made after testing at least three parts of my program. Explain how I used or remixed someone else's project in my prototype and give them credit.	how to use a development environment and the basics of programming. Present the challenges, and benefits of using tools to program collaboratively.

Suggested Duration

Duration based class meeting 5x a week with 45 min periods

- 2 weeks, without class projects ~ 7.5 hrs
- 3+ weeks, with projects 11.25 hrs

Some classrooms may need more time based on the time allotted to finish various project activities.

Prerequisites

None - this is the start of the unit! While some students may have some programming experience, we are assuming that they are coming in without any prior programming experience.

Overview of Instructional Materials

Each learning activity on the curriculum website has been broken down into 1-2 period lessons. The resources below are teacher-facing notes on the suggested implementation for the curriculum; they include structures for content delivery, suggestions for assessment, and resources for each lesson segment. At the end of each learning activity is a slightly longer project to serve as a summative assessment; at the end of the unit, there is an end of unit project.

Teachers should review these materials and use them as they apply to their classroom. This is the suggested implementation, but it should be modified to fit student population, class period constraints, etc.

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Sequence of Lessons		
LA 1 Create a grayscale drawing	**LA 2 Make it vary**	**LA 3 Make it colorful**
U1LA1.1 - p5.js & Editor Intro, unplugged robot activity U1LA1.2 - Greyscale, drawing lines U1LA1.3 - Creating Rectangles & Ellipses along layering U1LA1.4 - Various Shapes, stroke and stroke weight U1LA1 - Mini project: Taijitu Symbol U1LA1 - Mini project: Taijitu Symbol teacher notes	U1LA2.1 - Intro to Variables (System Variables) U1LA2.2 - Custom Variables in p5.js U1LA2.3 - Random Function U1LA2 - Mini project: Teacher Notes U1LA2 - Mini project:	U1LA3.1 - Intro to Color (Additive vs. Subtractive Mixing) U1LA3.2 - RGB vs. HSB Color Mode U1LA3.3 - Color palettes & Design Unit 1 - Final project: Abstract Album Art