Unit 4: Start Your Engines! Game Engine Programming and Prototyping

Content Area: **Technology**
Course(s):
Time Period: **December**
Length: **4 weeks**
Status: **Published**

Enduring Understandings

Technology evolves at an ever accelerating pace based on the needs/wants of society and is influenced by cultural, political, and environmental values and constraints.

Technological outcomes have the potential for anticipated and unanticipated positive and negative results.

Video game design involves creating an experience that is both functional and engaging for the user.

Essential Questions

How do we as humans rely on technology in today's society?

How has technology helped to extend human capabilities throughout history?

How does the design process help to produce more successful technologies?

What are some methods used to share design ideas?

How are science, technology, engineering, and math interrelated?

How do the constraints of a design challenge ultimately impact the final product?

Why is it so important for average citizens to become technologically literate?

Content

Skills

Video game design involves creating an experience that is both functional and engaging for the user.

At the conclusion of this unit, students will be able to:

Utilize the design loop to solve technological problems using constraints and specifications.

Communicate an understanding and application of the design process through participation in class discussion and design challenges.

Create a model or prototype for a solution to a technological problem.

Vocabulary:

Java.

Binary.

Methods.

Functions.

Variables.

Parameters.

Recursion.

Syntax, logic, and run-time errors.

Resources

Every student should have the opportunity to learn computer science. Exposing the learner to multiple platforms for learning code facilitates a better understanding of the extensive resources available while creating a broad foundation of the basic concepts and principles behind computer science. The Video Game Design class will use the following platforms and resources across the Units of Study:

1. YoYo Games - GameMaker for MAC; Based on C programming language, this resource gives you all the power of other programming languages but with added Drag and Drop functionality.

2. "Alice" is an innovative, open source 3D programming environment that makes it easy to create an animation for telling a story or playing an interactive games.

3. "Scratch" helps young people learn to think creatively, reason systematically, and work collaboratively — essential skills for life in the 21st century.

4. An Hour of Code (web based) is an introduction to JavaScript that provides an opportunity to students to learn the basics of JavaScript programming while creating fun drawings with code.

5. A derivative of Java known as Processing. Processing is a flexible software sketchbook and a language for learning how to code within the context of the visual arts.

6. Other programming languages that may be explored are Ruby or Phython.

Throughout this course the learner's experience will be enhanced using the following:

- TED-Ed Originals; short, award-winning animated videos about ideas that spark the curiosity of learners everywhere.

- Ted Talks videos (Ted.com). TED Talks are influential videos from expert speakers on education, business, and computer science. For instance, this video will enhance students understanding of pixels and advancements in technology that will be realized in their lifetime. Reach into a computer and grab pixels: https://www.ted.com/talks/jinha_lee_a_tool_that_lets_you_touch_pixels

- Many YouTube videos that relate to computer science. Ie. This sample video will be used to supplement the animation unit: PIXAR Explained - https://youtu.be/Z1R1z9ipFnM or https://www.youtube.com/watch?v=Z1R1z9ipFnM&feature=em-uploademail .

Makey Makey inspires science, technology, engineering, art and math (STEAM). This product is an invention kit for the 21st century. It turns everyday objects into touchpads and combine them with the internet.

Dash Robot teaches robotics. Dash uses Wonder, Blockly, and other apps to create new behaviors for Dash. It works with iOS and Android devices.

Textbook: Level Up! The Guide to Great Video Game Design Paperback – April 28, 2014 by Scott Rogers

Three "older" computers to be used for hardware labs and demonstrations.

Standards

TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
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.8.2.8.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.B.2	Identify the desired and undesired consequences from the use of a product or system.
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.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.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.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).