Unit 1: History of Video Games

Content Area: **Math**
Course(s): **Generic Course**
Time Period: **Marking Period 1**
Length: **3 weeks**
Status: **Published**

Standards

Computer Science Standards

CS.9-12.8.1.12.CS.2	Model interactions between application software, system software, and hardware.
CS.9-12.8.1.12.CS.3	Compare the functions of application software, system software, and hardware.
CS.9-12.8.1.12.IC.1	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
CS.9-12.8.1.12.IC.3	Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources.
CS.9-12.8.2.12.EC.1	Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.
CS.9-12.8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.
CS.9-12.8.2.12.EC.3	Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ETW.4	Research historical tensions between environmental and economic considerations as driven by human needs and wants in the development of a technological product and present the competing viewpoints.

Life Literacies and Key Skills

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).

Transfer Goals

Transfer Goals

Students will be able to independently use their learning to describe the effect of the history of video games on modern technology and society.

Concepts

Essential Questions

- Why were the first video games created?
- How have video games changed over time?

Understandings

Students will understand...

- Early video games were limited by the hardware, memory, and time allotted.
- Video games were seen as a welcome distraction even in the earliest stages of computing.
- Determining which video game was "first" depends on your definition of video game.

Critical Knowledge and Skills

Knowledge

Students will know...

- The elements that make up a video game.
- The general timeline of the first video games.
- The scope of early video games.

Skills

Students will be able to...

- Determine which elements of a video game were eliminated due to hardware limitations.
- Describe early video game development.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Class Notes
- Open Note Quiz
- Written Responses

School Summative Assessment Pan

- Shared Presentation: Describe an early video game you might create. Indicate which decisions are made based on hardware limitations.
- Unit Test (done on LinkIt)

Primary Resources

Smithsonian: History of Video Games: https://www.si.edu/spotlight/the-father-of-the-video-game-the-ralph-baer-prototypes-and-electronic-games/video-game-history

Supplementary Resources

- **Pong: An Introduction to Implementing Computer Game Strategies**
  - http://www.jgorasia.com/Files/Spring08/ICB/Gorasia_Harris.pdf
- YouTube Videos (updated annually)

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**
  - Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
  - GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.

- **One to One Student Laptops**
  - All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

- **Gifted Students (N.J.A.C.6A:8-3.1)**
  - Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.

- **English Language Learners (N.J.A.C.6A:15)**
  - Within each lesson, the English Language Learners are given choice of topic and resources so that their materials are within their ability to grasp the language.
  - All assignments have been created in the student's native language.
  - Work with ELL Teacher to allow for all assignments to be completed with extra time.

- **At-Risk Students (N.J.A.C.6A:8-4.3c)**
  - Within each lesson, the at-risk students are given choice of topic and resources so that their materials are within their ability level and high-interest.

- **Special Education Students (N.J.A.C.6A:8-3.1)**
  - Within each lesson, special education students are given choice of topic and resources so that their materials are within their ability level and high-interest.
  - All content will be modeled with examples and all essays are built on a step-by-step basis so modifications for assignments in small chunks are met.
  - All other IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

- **Language Arts**
  - Students will provide written responses, using correct terminology.
  - Students will learn how to parse code.
- **Science**
  - Students will consider the physics of a basic Pong game.

- **Social Studies**
    - Students will learn the place of Pong in the history of video game development.
- **World Languages**
- **Visual/Performing Arts**
    - Students will create their own sound effects for use in the game.
- **Applied Technology**
- **Business Education**
- **Global Awareness**

Learning Plan / Pacing Guide

Week 1:

- Install Love2D and Lua
- Download Pong source code
- Begin Class Notes

Week 2:

- Open Note Quiz
- Complete Class Notes

Week 3:

- Unit Test
- Unit Project

Unit 2: Text Adventure Games (Interactive Fiction)

Content Area: **Applied Tech**
Course(s): **Generic Course**
Time Period: **Marking Period 1**
Length: **2 weeks**
Status: **Published**

Standards

Computer Science Standards

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CS.9-12.8.1.12.CS.3	Compare the functions of application software, system software, and hardware.
CS.9-12.8.1.12.IC.1	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
CS.9-12.8.2.12.EC.2	Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.
CS.9-12.8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
CS.9-12.8.2.12.NT.2	Redesign an existing product to improve form or function.

Life Literacies and Key Skills

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
TECH.9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Transfer Goals

Transfer Goals

Students will be able to independently use their learning to create their own interactive fiction game.

Concepts

Essential Questions

- What are the different types of players we need to consider when designing a video game?
- What are the most important elements of an itnteractive fiction game?
- What is the role of storytelling in video game design?

Understandings

Students will understand...

- Interactive fiction games were an earlier genre of game that is still popular today.
- The elements that make up a video game are more than graphics and programming.
- The necessity of storytelling in a video game.

Critical Knowledge and Skills

Knowledge

Students will know...

- The elements of storytelling.
- The necessity of player choice in a game.
- The role of a storyteller in a game.

Skills

Students will be able to...

- Write an interactive fiction game with at least three choices.
- Create a flowchart of the options in their game.
- Anticipate the user experience in their game.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Class Notes
- Iterative Development
- Open Note Quiz
- Written Responses

School Summative Assessment Pan

- Project: Create an Interactive Fiction Game (Students create the rubric as a group.)
- Unit Test (done on LinkIt)

Primary Resources

- **Think Python: How to Think Like a Computer Scientist**
    - https://greenteapress.com/thinkpython2/html/index.html

Supplementary Resources

- **Nerdy Teacher: Interactive Fiction with Python**
    - http://www.thenerdyteacher.com/2021/06/interactive-fiction-with-python-makered.html
- **The Dreamhold**
    - https://zarfhome.com/dreamhold/
- **Replit**
    - https://replit.com/

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**
    - Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
    - GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.

- **One to One Student Laptops**
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Differentiated Instruction

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Interdisciplinary Connections

- **Language Arts**
    - Students will write a story and discuss storytelling elements.
- **Science**
- **Social Studies**
- **World Languages**
- **Visual/Performing Arts**
    - Students will use ASCII art in their game.

- **Applied Technology**
- **Business Education**
    - Students will learn about the feasibility of sharing interactive fiction games for profit.
- **Global Awareness**

Learning Plan / Pacing Guide

Week 1:

- Introduction to Interactive Fiction
- Play The Dreamhold
- Review Storytelling Elements
- Quiz

Week 2:

- Project (Create rubric, outline, final submission)
- Test

Unit 3: Pygame

Content Area: **Applied Tech**
Course(s): **Generic Course**
Time Period: **Marking Period 1**
Length: **4 weeks**
Status: **Published**

Standards

Computer Science Standards

CS.9-12.8.1.12.AP.1	Design algorithms to solve computational problems using a combination of original and existing algorithms.
CS.9-12.8.1.12.AP.2	Create generalized computational solutions using collections instead of repeatedly using simple variables.
CS.9-12.8.1.12.AP.3	Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
CS.9-12.8.1.12.AP.4	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.
CS.9-12.8.1.12.CS.1	Describe ways in which integrated systems hide underlying implementation details to simplify user experiences.
CS.9-12.8.1.12.CS.2	Model interactions between application software, system software, and hardware.
CS.9-12.8.1.12.IC.2	Test and refine computational artifacts to reduce bias and equity deficits.

Life Literacies and Key Skills

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.TL.3	Analyze the effectiveness of the process and quality of collaborative environments.
TECH.9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).

Transfer Goals

Transfer Goals

Students will be able to independently use their learning to create games using the pygame engine.

Concepts

Essential Questions

- What are the important elements of creating a game in pygame?
- What does the pygame library provide for the programmer when creating a game?

Understandings

Students will understand...

- The necessity of troubleshooting and debugging programs.
- The place of a library in Python video game design.
- The role of player control in video game design.

Critical Knowledge and Skills

Knowledge

Students will know...

- Player Controls
- Sprite Interactivity
- Types of Motion

Skills

Students will be able to...

- Add sprites to the screen.
- Have players control and interact with sprites.
- Import the pygame library.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Guided Notes
- Pygame projects following tutorials
- Reflections

School Summative Assessment Pan

- Final Project (combination of smaller projects or completely new project)
- Pygame Test

Primary Resources

- **Making Games with Python and Pygame**
  - https://inventwithpython.com/pygame/

Supplementary Resources

- **Think Python**
  - https://greenteapress.com/thinkpython2/html/index.html
- **Pygame: A Primer**
  - https://realpython.com/pygame-a-primer/

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**
  - Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks,

Additional Resources/ Support, Homework, etc.)
    - GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.

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Differentiated Instruction

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Interdisciplinary Connections

- **Language Arts**
- **Science - Students will bring elements of physics into their games.**
- **Social Studies**
- **World Languages**
- **Visual/Performing Arts - Students will create sprites for their games.**
- **Applied Technology**
- **Business Education**

- **Global Awareness**

Learning Plan / Pacing Guide

Week 1:

- Python Review
- Introduction to Pygame

Week 2:

- Screen Saver
- Wormy Game

Week 3:

- Platform Jumper
- Star Pusher

Week 4

- Final Project

Unit 4: Unity

Content Area: **Applied Tech**
Course(s): **Generic Course**
Time Period: **Marking Period 2**
Length: **8 weeks**
Status: **Published**

Standards

Computer Science Standards

CS.9-12.8.1.12.AP.1	Design algorithms to solve computational problems using a combination of original and existing algorithms.
CS.9-12.8.1.12.AP.2	Create generalized computational solutions using collections instead of repeatedly using simple variables.
CS.9-12.8.1.12.AP.3	Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
CS.9-12.8.1.12.AP.4	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.
CS.9-12.8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
CS.9-12.8.1.12.AP.6	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
CS.9-12.8.1.12.AP.7	Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users.
CS.9-12.8.1.12.AP.8	Evaluate and refine computational artifacts to make them more usable and accessible.
CS.9-12.8.1.12.AP.9	Collaboratively document and present design decisions in the development of complex programs.
CS.9-12.8.1.12.CS.1	Describe ways in which integrated systems hide underlying implementation details to simplify user experiences.
CS.9-12.8.1.12.CS.2	Model interactions between application software, system software, and hardware.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.

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Transfer Goals

Transfer Goals

Students will be able to independently use their learning to create a game using the Unity game engine.

Concepts

Essential Questions

- How are design and programming interrelated in video game design?
- What is a video game engine?
- Why is cooperation important when designing a video game?

Understandings

Students will understand...

- Different video game engines are best suited for different types of games.
- Error messages are helpful, not rude and terrifying.
- Video games are almost never an individual endeavor.

Critical Knowledge and Skills

Knowledge

Students will know...

- Box Colliders
- Camera Control
- Game Objects
- Heirarchy
- Inspector
- Physics Materials
- Scripts

Skills

Students will be able to...

- Create a 2D game in Unity.
- Create a 3D game in Unity.
- Install Unity and create a project.
- Troubleshoot and debug a game program.
- Work as part of a group to create a game.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Reflections
- Guided Tutorials
- Game Engine Slides

School Summative Assessment Pan

- Final Unity Project
- Unity Test

Primary Resources

- **Unity Game Development Cookbook**
  by Paris Buttfield-Addison, Jon Manning, Tim Nugen

Supplementary Resources

- **Coding in Flow: Building Your First 3D Game**
  - https://www.youtube.com/playlist?list=PLrnPJCHvNZuB5ATsJZLKX3AW4V9XaIV9b
- **Coding in Flow: Building Your First 2D Game**
  - https://www.youtube.com/playlist?list=PLrnPJCHvNZuCVTz6lvhR81nnaf1a-b67U

Technology Integration and Differentiated Instruction

Technology Integration

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Interdisciplinary Connections

- **Language Arts - Students will write a brief story background for their 2D game.**
- **Science - Students will apply physics in their games.**
- **Social Studies**
- **World Languages**
- **Visual/Performing Arts - Students will create sprites for their games.**
- **Applied Technology - Students will learn the interaction between the game engine and the language interpreter.**
- **Business Education**
- **Global Awareness - Students will discuss the role of game engines in developing games for a worldwide audience.**

Learning Plan / Pacing Guide

Week 1:

- What is a video game engine?
- Shared Game Engine Slides presentations

Week 2:

- Install Unity
- Install Visual Studio
- Introduction to the Unity IDE

Week 3:

- Begin 3D game tutorial
- Reflections

Week 4:

- Complete 3D game tutorial
- Reflections

Week 5:

- Begin 2D game tutorial
- Reflections

Week 6:

- Complete 2D game tutorial
- Reflections

Week 7:

- Introduce Final Project Options
- Create Teams
- Work on Final Project

Week 8:

- Present Final Projects
- Unity Test
- Reflections