FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

COMPUTER GAME DESIGN

Date: January 2016
Proposed Grade Level(s): Grade 6-8
Grading: A-F
Prerequisite(s): None

Course Length: Year
Subject Area: Technology Elective
Credits: N/A

CTE Sector/Pathway: Information and Communication Technology / Games and Simulation
Articulation Units: Pathway to High School Programming
Intent to Pursue 'A-G' College Prep Status: No

COURSE DESCRIPTION:

This course is designed to be a completely "hands-on" introduction to the programming of computer games. Students in this course will create their own computer games while learning the basics of computer programming. Students will be encouraged to be self-motivated and work at their own pace. Student will have the opportunity to progress through increasingly complex computer programming languages while completing trimester long projects.

This class is designed to help students prepare for, and excel in, future high school computer science courses. Furthermore, this class will integrate into the CTE Pathway for "Computer Science and Game Design" and the CTE Pathway for "Engineering" offered in high school.

GENERAL GOALS/ESSENTIAL QUESTIONS:

The general goal of this course is to introduce students to computer programming through design of computer games. This course, as mentioned in the description, will better prepare students for the pathways at either high school by exposing students to components of programming, game design, and engineering concepts.

Students will:
Receive instruction on basics of computer programming.
Participate in hands-on, activity oriented learning.
Work collaboratively in partnerships and/or group learning.
Create individual and group projects where the outcome of their work is a basic computer game.
Enjoy a challenging program that incorporates and addresses the goal of raising standards of learning.
Have the opportunity to continue the program into high school where the opportunities below are available:

- CTE Pathway for "Information and Communication Technologies - Game Design Development"

CCSS READING COMPONENT:

The purpose of the reading in this course is threefold: 1) Students will gain competency in technical reading, both in teacher materials and research based information on the web and in books; 2) Students

will gain a general understanding of the work skills needed to be successful in the programming industry; and 3) Students will gain an understanding of the basic components of computer programming and gaming through reading materials that include web page, handouts, books, and primary sources to gain knowledge of important concepts and academic vocabulary that are important to understanding and daily use.

Methods used will include, but are not limited to: guided reading, vocabulary-building activities, independent reading, and comprehension checks.

CCSS WRITING COMPONENT:

Students will keep a notebook of daily/weekly entries describing, summarizing, and analyzing the skills and concepts learned during the unit. They will create PowerPoint presentations and/or writing samples on a variety of work each trimester. The work will be consistent with the expectations laid out in the California Reading/Language Arts Standards for grades 7-8. The main focus of these projects is to allow students to demonstrate mastery of key skills and concepts learned in the units of study. Students will be expected to edit for grade level mechanical, grammatical, and rhetorical conventions.

CCSS SPEAKING AND LISTENING COMPONENTS:

Students will complete a variety of formal and/or informal oral presentations expressing their knowledge of the subject area of study. Students may be assessed orally as well. Oral presentations may be both individual or with a partner/group.

CTE INDUSTRY SECTOR / PATHWAY / STANDARDS:

Information and Communication Technologies Standards

1.0 Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Information and Communication Technologies academic alignment matrix for identification of standards.

2.0 Communications

Acquire and accurately use Information and Communication Technologies sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

3.0 Career Planning and Management

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

4.0 Technology

Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the Information and Communication Technologies sector workplace environment.

5.0 Problem Solving and Critical Thinking

Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Information and Communication Technologies sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

6.0 Health and Safety

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Information and Communication Technologies sector workplace environment.

7.0 Responsibility and Flexibility

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Information and Communication Technologies sector workplace environment and community settings.

8.0 Ethics and Legal Responsibilities

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

9.0 Leadership and Teamwork

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution such as those practiced in the Future Business Leaders of America and SkillsUSA career technical student organization.

Apply essential technical knowledge and skills common to all pathways in the Information and Communication Technologies sector, following procedures when carrying out experiments or performing technical tasks.

11.0 Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the Information and Communication Technologies anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings.

Information and Communication Technologies/Game Design and Development/Standards

D1.0

Identify and describe critical game and simulation studies, the resulting societal impact, and the management, industry, and career requirements.

D1.1

Categorize the different gaming genres and gaming systems.

D1.2

Describe the historical significance of electronic and non-electronic games.

D1.3

Describe the role of play in human culture.

D1.4

Describe the psychological impact of games on individuals and groups.

D1.5

Identify the core tasks and challenges that face a game or simulation design team.

D1.8

D2.0
Demonstrate an understanding of game and simulation analysis, design, standard documentation, and development tools.

D2.1
Demonstrate an understanding of the vocabulary for discussing games and play by listing and describing the general procedure and requirements of game and simulation design.
D2.2
Describe the game development life cycle.
D2.3
Develop a game design document or blueprint.
D2.4
Understand the general principles of storytelling and the use of storyboarding in game design.
D2.5
Know how to use tools and software commonly used in game/simulation development and become familiar with popular game tools and different gaming engines.
D2.7
Describe the complex interaction between games and players and the role it plays in the popularity of a game.
D2.8
Experience the methods used to create and sustain player immersion.
D2.10
Make informed decisions about game physics: how the game world works, how the players interact with the game world, and how the players interact with one another.

D3.0
Create a working game or simulation individually or as part of a team.

D3.1
Create a storyboard describing the essential elements, plot, flow, and functions of the game/simulation.
D3.3
Using simple game development tools create a game or simulation.
D3.4
Present the game or simulation.

D4.0
Identify, describe, and implement standard game/simulation strategy and rules of play.

D4.1
Understand strategic outlining in game designs.
D4.2
Know elements of puzzle design.
D4.3
Use key strategic considerations in game design.
D4.4
Understand the process of creating and designing player actions.
D4.5
Create and design the game flow as it relates to story and plot.
D4.6
Assess common principles and procedures in game flow design.

DETAILED UNITS OF INSTRUCTION:

Introduction to Programming -
The goal of this unit is to familiarize students with the basic concepts behind computer programming that are universal to all programming languages. Students will start out using a simple, introductory programming language in order to learn basics programming concepts such as variables, input/output, decision loops, etc. Students will complete several short programming projects set up as games.

Introduction to Game Design -
Students will learn what makes a "good" game. Students will plan out and implement their first game. To do so, students will complete a series of lessons:

- Terms and Concepts
- Core Design Elements
- Balance
- Design
- Testing and Refinement

Animation -
Students will learn to create animation that can be used in for a game or to tell a story. This is the first of two major, self-directed projects for this course. Students will:

1. Plan out an animated scene. This should tell be narrative, or "tell a story".
2. Using skills learned in the class up to this point, students will program their scene as a 3D animation

Game Project -
This is the second major project of the class. Students will tie together all the skills and concepts learned in the class to create a final game project of their choice. Students will go through all the stages of game design:

1. Plan the game
2. Make decisions on how to implement the game
3. Code the game
4. Test their own and other students games
5. Revise and refine their game
6. Present their game

TEXTBOOKS AND RESOURCE MATERIALS:

"Scratch"; MIT Media Lab; https://scratch.mit.edu/
"GameStar Mechanic"; E-Line Media & Institute of Play; https://gamestarmechanic.com/
"Alice"; Carnegie Mellon University; http://www.alice.org/
"Kodu Game Lab"; Microsoft Research FuseLabs; http://www.kodugamelab.com/

COMMON CORE STANDARDS TO BE ADDRESSED:

Reading:
Key Ideas and Details:
CCSS.ELA-LITERACY.CCRA.R.1 – Read closely to determine what the text says explicitly ad to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from text.

Integration of Knowledge and Ideas:
CCSS.ELA-LITERACY.CCRA.R.7 – Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
CCSS.ELA-LITERACY.CCRA.R.9 – Analyze how two or more texts address similar topics in order to build knowledge or to compare the approaches the authors take.
Range of Reading and Level of Text Complexity:
CCSS.ELA-LITERACY.CCRA.W.1 – Read and comprehend complex informational texts independently and proficiently.
Writing:
Text Types and Purposes:
CCSS.ELA-LITERACY.CCRA.W.1 – Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
CCSS.ELA-LITERACY.CCRA.W.2 – Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
Production and Distribution of Writing:
CCSS.ELA-LITERACY.CCRA.W.4 – Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CCSS.ELA-LITERACY.CCRA.W.5 – Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
CCSS.ELA-LITERACY.CCRA.W.6 – Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
Research to Build and Present Knowledge:
CCSS.ELA-LITERACY.CCRA.W.7 – Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
CCSS.ELA-LITERACY.CCRA.W.8 – Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
CCSS.ELA-LITERACY.CCRA.W.9 – Draw evidence from informational texts to support analysis, reflection, and research.
Range of Writing:
CCSS.ELA-LITERACY.CCRA.W.10 – Write over extended time frames and shorter time frames for a range of tasks, purposes, and audiences.
Speaking and Listening:
Comprehension and Collaboration:
CCSS.ELA-LITERACY.CCRA.SL.1 – Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
CCSS.ELA-LITERACY.CCRA.SL.2 – Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Presentation of Knowledge and Ideas:
CCSS.ELA-LITERACY.CCRA.SL.4 – Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
CCSS.ELA-LITERACY.CCRA.SL.5 – Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
Language:
Conventions of Standard English:
CCSS.ELA-LITERACY.CCRA.L.1 – Demonstrate command of the conventions of Standard English grammar and usage when writing or speaking.

CCSS.ELA-LITERACY.CCRA.L.2 – Demonstrate command of the conventions of Standard English capitalization, punctuation, and spelling when writing.

Vocabulary Acquisition and Use:

CCSS.ELA-LITERACY.CCRA.L.4 – Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

CCSS.ELA-LITERACY.CCRA.L.6 – Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Mathematics:

Domain 7.RP.3

Use proportional relationships to solve multistep ration and percent problems.

Domain 7.EE.4

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Domain 7.G.1

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Domain 8.EE.7

Solve linear equations in one variable

Domain 8.F

Define, evaluate, and compare functions.

DISTRICT ESLRS TO BE ADDRESSED:

Students will be:

- **Self-Directed Learners**: Throughout this class, students will be self-directed in creating their own projects. Though each project will have general guidelines and guidance, students will be expected to design and implements projects of their choice. In order to do so, each student will need to seek out and obtain the skills and knowledge they need to implement their own game in order for their game to operate according to the students own directives.
- **Efficient Communicators:** Students in this class will learn communicate and explain their design concepts to others, as well as learn to effectively give feedback to others on their concepts.
- **Quality Producer**s: Students will learn to produce a finished product, working through the design process from start to finish. Students will understand that quality products require a process of design, implementation, testing, and refinement.
- **Constructive Thinkers**: Students will learn to use organization, logic, and research in order to overcome problems and challenges in the design process.
- **Collaborative Workers**: Though students will be working independently, they will be expected to collaborate with others in order to test, evaluate, and give feedback to other students.
- **Responsible Citizens**: This elective will require students to be self-motivated and self-directed to a high degree. As such, students will learn to accept responsibility and consequences of their actions and who demonstrate their understanding of their role in the learning process.