Course Title: Introduction to Video Game Design
Board Approval Date: 4/15/13
Credit / Hours: 0.5credit

Course Description:

Introduction to Video Game Design focuses on mastery of the PA Academic Standards for Business, Computer and Information Technology, PA Academic Standards for Science and Technology, as well as PA Academic Standards for Mathematics. As students progress through Introduction to Video Game Design, they will participate in a systematic study of video game design including both technological and creative aspects of development, video game programming design and development, video game digital artwork creation, and video game project development management.

Introduction to Video Game Design is an elective course that will explore current technological options available for programming a video game. Specifically, students will explore game-design tools, identify and fix game design problems, create original video game programs, and demonstrate the video game design process from conception to completion.

Introduction to Video Game Design incorporates mathematical relationships, logic, creativity, and error analysis while promoting critical thinking and problem solving skills.

Learning Activities / Modes of Assessment:

Large group instruction	Tests and Quizzes
Small group work	Checklists / Teacher Observation
Computer program experiments	Projects with Rubrics
Reading assignments	Writing assignments

Instructional Resources:

Introduction to Video Game Design (The Goodheart-Wilcox Company, Inc. 2012)
Blender Lite Edition – Open Source 3D modeling software; blender.org
Game Maker Software – Open Source Object Oriented Game Design Engine; yoyogames.com
Various instructional videos and educational websites
Various school appropriate video game demonstrations for analysis
edmodo.com
Microsoft (MS) Word, MS Excel, MS PowerPoint Software

Course Pacing Guide

Course: **Introduction to Video Game Design**

Course Unit (Topic)	Length of Instruction (Days/Periods)
1. Game Build Sequence	35 days
2. Programming Sequence	14 days
3. Art Sequence	16 days
4. Management Sequence	<u>15 days</u>
DAYS TOTAL	80 Days

Topic: 1. Game Build Sequence

Subject(s):

Days: 35

Grade(s):

Know:	Understand:	Do:
Identify different computer languages used in video game design. Be able to define common game design vocabulary. How to identify and label the user interface for the Game Maker Software. Be able to identify commands, buttons and hot keys for use in the game development software. How to use game-design tools to create video games including animated objects, backgrounds, programming rules, iteration, platforms, gravity simulation, scrolling and mapping of game coordinates. How to identify and fix game errors based on testing. How to perform a critical evaluation of a game build and suggest possible improvements. How to demonstrate knowledge of embedded marketing and advertising in games.	Video game design includes both technological and creative aspects.	**15.4.12.A. – Unranked** Apply the creative and productive use of emerging technologies for educational and personal success. **15.4.12.B. – Unranked** Evaluate the impact of social, legal, ethical, and safe behaviors on digital citizenship. **15.4.12.H. – Unranked** Use programming languages to develop logical thinking and problem solving skills. **15.4.12.J. – Unranked** Create a complex computer program to solve a problem. **15.9.12.C. – Unranked** Evaluate the influence of members of a marketing channel, including company, intermediaries, retailer, and consumer. **2.1.8.B – Important** REPRESENT NUMBERS IN EQUIVALENT FORMS - Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots, absolute values). **2.2.8.C – Essential** EVALUATE NUMERICAL EXPRESSIONS - Use the order of operations to evaluate numerical expressions. **2.2.8.B – Essential** COMPUTATION - Add, subtract, multiply, and divide different kinds and forms of rational numbers including integers, decimal fractions, percents, and proper and improper fractions. **2.3.8.C – Essential** CALCULATIONS - Calculate volume, surface area, and degrees of angles; calculate circumference and area of circles, and use a measurement formula to solve for a missing quantity.

Topic: 1. Game Build Sequence

Days: 35

Subject(s):

Grade(s):

Know:	Understand:	Do:
		2.4.8.B – Important CONNECTIONS - Use if…then statements to construct simple valid arguments. **2.5.8.A – Important** PROBLEM SOLVING - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, apply estimation skills as appropriate, check whether the plan makes sense, and explain how the problem was solved in grade appropriate contexts. **2.7.8.A – Important** CALCULATION OF PROBABILITIES - Calculate the probability of an event involving "and", "or" or "not". **9.3.12.A – Unranked** Explain and apply the critical examination processes of works in the arts and humanities. • Compare and contrast • Analyze • Interpret • Form and test hypotheses • Evaluate/form judgments 3.4.10.C1. Apply the components of the technological design process. 3.4.10.C2. Analyze a prototype and or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.10.A2. Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems. 3.4.10.D2.

Topic: 1. Game Build Sequence

Subject(s):

Days: 35

Grade(s):

Know:	Understand:	Do:
		Diagnose a malfunctioning system and use tools, materials and knowledge to repair it.
		CC.3.5.11-12.E.
		Analyze how the text structures informaion or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
		CC.3.5.11-12.D.
		Determine the meaning of symbols, key terms,and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 text topics.
		CC.3.5.9-10.G.
		Translate quantitative or technical information expressed in words in a text into visual form and translate information expressed visually or mathematically into words.
		CC.3.6.11-12.B.
		Write informative, explanatory texts, including the narration of historical events, scientific procedures and experiments or technical processes.

Topic: 2. Programming Sequence

Days: 14

Subject(s):

Grade(s):

Know:	Understand:	Do:
	Video game design includes specific sets of instructions programmed through computer code.	**15.4.12.H. – Unranked** Use programming languages to develop logical thinking and problem solving skills.
		15.4.12.J. – Unranked Create a complex computer program to solve a problem.
		15.4.12.A. – Unranked Apply the creative and productive use of emerging technologies for educational and personal success.
		15.4.12.G. – Unranked Create an advanced digital project using sophisticated design and appropriate software/applications.
		2.4.8.B – Important CONNECTIONS - Use if…then statements to construct simple valid arguments.
		2.4.8.A – Important REASONING - Draw inductive and deductive conclusions within mathematical contexts.
		2.5.8.A – Important PROBLEM SOLVING - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, apply estimation skills as appropriate, check whether the plan makes sense, and explain how the problem was solved in grade appropriate contexts.
		3.4.10.C1. Apply the components of the technological design process. 3.4.10.C2. Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.10.A2.

Topic: 2. Programming Sequence

Days: 14

Subject(s):

Grade(s):

Know:	Understand:	Do:
		Interpret how systems thinking applies logic and creativity with appropriate compromises in complex real-life problems. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text to a visual form and translate information expressed visually or mathematically into words.

Topic: 3. Art Sequence

Days: 16

Subject(s):

Grade(s):

Know:	Understand:	Do:
How to apply the elements of art and the principles of design to a video game. How to create, move, rotate, and apply materials to three dimensional objects for use in video games. How to add boolean operations to modify objects in video game design. How to create a video game scene using backgrounds, textures, noise, lighting, cameras and stop-motion animation.		**15.4.12.H. – Unranked** Use programming languages to develop logical thinking and problem solving skills. **15.4.12.J. – Unranked** Create a complex computer program to solve a problem. **15.4.12.A. – Unranked** Apply the creative and productive use of emerging technologies for educational and personal success. **15.4.12.G. – Unranked** Create an advanced digital project using sophisticated design and appropriate software/applications. **2.4.8.A – Important** REASONING - Draw inductive and deductive conclusions within mathematical contexts. **2.4.8.B – Important** CONNECTIONS - Use if…then statements to construct simple valid arguments. **2.5.8.A – Important** PROBLEM SOLVING - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, apply estimation skills as appropriate, check whether the plan makes sense, and explain how the problem was solved in grade appropriate contexts. **9.1.5.J – Essential** Apply traditional and contemporary technologies for producing, performing and exhibiting works in the arts or the works of others. • Experiment with traditional technologies (e.g., ceramic/wooden tools, earthen clays, masks, instruments, folk shoes, etching tools, folk looms). • Experiment with contemporary technologies (e.g., color fills on computers, texture methods on computers, fonts/point systems, animation techniques, video teleconferencing, multimedia techniques, internet access, library computer card catalogues).

Topic: 3. Art Sequence

Days: 16

Subject(s):

Grade(s):

Know:	Understand:	Do:
		9.1.5.A – Essential Know and use the elements and principles of each art form to create works in the arts and humanities. • Elements 　　Dance: energy/force, space, time 　　Music: duration, intensity, pitch, timbre 　　Theatre: scenario, script/text, set design 　　Visual Arts: color, form/shape, line, space, texture, value • Principles 　　Dance: choreography, form, genre, improvisation, style, technique 　　Music: composition, form, genre, harmony, rhythm, texture 　　Theatre: balance, collaboration, discipline, emphasis, focus, intention, movement, rhythm, style, voice 　　Visual Arts: balance, contrast, emphasis/focal point, movement/rhythm, proportion/scale, repetition, unity/harmony **9.1.5.B – Essential** Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts. 　　Dance: move, perform, read and notate dance, create and choreograph, improvise 　　Music: sing, play an instrument, read and notate music, compose and arrange, improvise 　　Theatre: stage productions, read and write scripts, improvise, interpret a role, design sets, direct 　　Visual Arts: paint, draw, craft, sculpt, print, design for environment, communication, multi-media

Topic: 4. Management Sequence

Days: 15

Subject(s):

Grade(s):

Know:	Understand:	Do:
How to identify and organize the steps for a complete video game build. Be able to explain the project management of the video game build. Be able to demonstrate the video game build from conception to completion within the required specifications.	A video game build is a complex project the requires time, tasks and money.	**15.4.12.A. – Unranked** Apply the creative and productive use of emerging technologies for educational and personal success. **15.4.12.H. – Unranked** Use programming languages to develop logical thinking and problem solving skills. **15.4.12.J. – Unranked** Create a complex computer program to solve a problem. **15.4.12.K. – Unranked** Evaluate advanced multimedia work products and make recommendations based on the evaluation. **2.8.8.D – Essential** FUNCTIONS - Create a table or graph from a functional rule. 3.4.10.C1. Apply the components of the technological design process. 3.4.10.C2. Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures and experiments or technical processes.