Kingsway Regional School District

Committed to Excellence

Course Name: Introduction to Video Game Design I	**Grade Level(s): 9-12**
Department: Technology Department	**Credits: 5**
BOE Adoption Date: September 2019	**Revision Dates:**

Course Description and Outcomes

Introduction to Video Game Design I, students will gain a foundational understanding of Game Design by discovering the process through multiple perspectives. Students will explore the basic principles that work for various game types to obtain an understanding of the components that make top-quality video games. Students are introduced to industry leading software, the latest version of the Unity Game Engine. Video Game Design is a project and challenge based course that utilizes cross disciplines and incorporates Science Technology Engineering Art and Math (STEAM). By the end of the course, teams of students will take on the roles of game designers, creative directors, graphic designers, and game testers in planning, assembling and marketing a video game using the tools learned throughout the year.

Throughout this course:

- Students will , students describe the concepts, elements and effectiveness of video games through analysis and critique of existing video game designs.
- Students will be introduced to project management concepts used to create multiple video game concepts, storyboards and game documentation.
- Students will be introduced to basic coding using JavaScript and C# programming languages.
- Students will apply coding knowledge to create characters and objects in the environment.
- Students will communicate the design process and integrate 2D and 3D graphic objects in their games in a thematic manner
- Students will gain and understanding of audio (sound), video recording, and video editing in relation to game design.
- Students will be introduced to basic physics as related to video game movements.

Proficiencies and Pacing Guide:

Course Title: Introduction to Video Game Design I
Prerequisite(s): None

Unit Title:	Number of Weeks	Relevant Content Standards:	Learning Goals:	Learning Objectives/Topics and Skills (Identify the DOK Level)
Unit 1: Introduction to Video Game Design	6 weeks Sept - Oct	Tech.8.1.12.A2 Produce and edit a multipage digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review. Tech.8.1.12.F.CS2 Plan and manage activities to develop a solution or complete a project. Tech.8.2.12.B.1 Research and analyze the impact of the design constraints (specifications and limits) for a product or technology driven by a cultural, social, economic or political need and publish for review. TECH.8.2.12.C.6 Research an existing product, reverse engineer and redesign it to improve form and function. TECH.8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. Tech.8.2.12.E.4 Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and	Students will be able to research and analyze the design principles for games and improve game functionality. 8.2.12.B.1; 8.1.12.C.6 Students will learn to use appropriate software for the design, development and creation of assigned projects. 8.2.12.D.3	Identify basic game design principles, reciting common (visual, audial, interactive, narrative, etc.) choices styles, and/or aesthetics. (DOK 1) Define creative and critical thinking (DOK 1) Establish, list, and manage activities to complete a project. (DOK 1-3) Identify common game genres (DOK 1) Utilize the game editor user interface to open and organize a simple project or scene. (DOK 2) Utilize contemporary problem solving techniques (DOK 2) Generate models and materials for project(s) created within the Unity Editor. (DOK 2) Create a game proposal for a one button game. (DOK 2) Distinguish contemporary game genres and platforms. (DOK 3) Reconstruct the rules of contemporary games, in order to improve the gameplay experience. (DOK 3) Differentiate between a game review and a critical analysis of a game. (DOK 3)

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		conditional statements).		Differentiate 2D from 3D game environments. (DOK 3) Critique contemporary video games; providing adequate arguments and justification. (DOK 4) Use oral/written communication skills to clearly communicate and defend a position or conclusion with regard to a story specific issue or evaluation. (DOK 4) **Unit Terms:** Students will be able to identify the meanings of the following: file menu, edit menu, assets menu, game objects menu, component menu, window menu, help menu, transform tools, transform Gizmo toggles, gamevue controls, hierarchy, inspector, project browser, seen you, game view, 3D formats, 2D formats, packages, game objects, components, prefabs, Sprint, pixel to unit, manual slicing, automatic slicing, grid slicing, Sprite packing
Unit 2: Understanding Video Game Concepts	7 weeks Oct - Dec	TECH.8.2.12.E.3 Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games). TECH.8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.	Students will develop critical thinking skills to create original works individually or as a group. 8.1.12.B.CS2	Identify the benefits of creating a storyboard. (DOK 1) Define the components of the design and problem solving process. (DOK 1) Define & implement game pathways, choke points, spawn points, and methods of defining where game objects will meet at choke points. (DOK 1) Establish, list, and manage activities to complete a project. (DOK 1-3)

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		TECH.8.2.12.C.6 - Research an existing product, reverse engineer and redesign it to improve form and function. TECH.8.1.12.B.CS2 - Create original works as a means of personal or group expression.		Sequence events by writing variable, operators, and conditionals within a script. (DOK 2) Describe the Process of creating characters & designing character actions. (DOK 2) Explain the use of storyboarding in game design. (DOK 2) Explain the concept of a balanced layout. (DOK 2) Explain the principles of level design. (DOK 2) Deconstruct and review the general principles of storytelling. (DOK 3) Create a bug tracking list for software applications. (DOK 3) Differentiate contemporary scripting languages. (DOK 3) Create script(s) to perform an action in a game. (DOK 4) Create a basic script and attach it to one or more game objects. (DOK 4) Create and control terrains within the Unity Editor. (DOK 4) Create a sketch of a level layout for a hypothetical game. (DOK 4)

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				Unit Terms: Students will be able to identify the meanings of the following: road map, seen Gizmo, camera controls, perspective view, isometric view, transform tools, translate, rotate, scale, z-depth, sorting layer, grid, snap settings, scripting languages: boo, c#, JavaScript, character acceleration, air control, zero control, reduce control, full control, input manager: size, name, descriptive name, descriptive negative name, negative button, positive button, alternative button, all positive button, gravity, dead, sensitivity, snap, invert, type, join num, debug function
Unit 3: Principles of Gaming Environments	11 weeks Jan - Mar	TECH.8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. TECH.8.2.12.E.3 Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games). Tech.8.2.12.E.4 Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements). TECH.8.1.12.B.2 - Apply previous content knowledge by creating and piloting a digital learning game or tutorial.	Students will be able to use a programming language to create and play a digital game or tutorial. 8.1.12.B.2; 8.2.12.E.3	Identify contemporary game developmentals (DOK 1) List the different types of audio files used in most game engines. (DOK 1) Select the appropriate assets for projects of adequate format, size and use in a game. (DOK1) Establish, list, and manage activities to complete a project. (DOK 1-3) Explain the function in purpose of physics engines, middleware, 3D engines and level editors. (DOK 2) Explain how viewpoint impacts gameplay. (DOK 2) Describe how sound files and music are used to enhance game experience and provide realism.

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		TECH.8.1.12.C.CS4 - Contribute to project teams to produce original works or solve problems. TECH.8.2.12.D.1 - Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.		(DOK 2) Demonstrate the importance of scene balancing. (DOK 3) Differentiate graphical user interfaces and human machine interfaces. (DOK 3) Apply 2D and 3D sounds appropriately within the game environment. (DOK 3) Apply terrain and environment effects within the game environment, skins to game interfaces and skyboxes to create dynamic game world environments. (DOK 3) Write scripts that perform specific functions. (DOK 4) Position lighting and cameras in order to focus attention within a game. (DOK 4) Create and place cameras within 2D and 3D game environments. (DOK 4) Create scripts to manage audio files within the game environment. (DOK 4) Create a game using a guided practice approach. (DOK 4) **Unit Terms:** Students will be able to identify the meanings of the following: animation principles: anticipation, appeal, arcs, exaggeration, follow through and overlapping action, secondary

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				action, slow and slow out, solid drawing, squash and stretch, staging, straight ahead action and pose to pose, timing, frame animation, animation components, animation window, key frame editor, keyed frames, tangents, dope sheet, animation events, state machines, animation state machines, animator controller, animator components, animation layer, transitions, blend trees, mass, gravity, force, rotation, general physics settings, layer collision matrix, Ridgid bodies, colliders, constraints, trigger components, checkpoints, critical path, respond, collectibles: floating coins, coin boxes, 3 coin values, damage trigger, variable, variable type, functions, four types of inner face colon diegetic and non-diegetic, meta, spatial, GY skin, GY controls, compound controls, GUI class, GY layouts, GUI text, GUI texture, splash screen, title screen, game over screen, game win screen, heads up display, particle, particle system, particle effect, audio source, audio listener, audio file formats
Unit 4: Video Game Development	11 weeks Mar - June	TECH.8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. TECH.8.2.12.E.3 Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games). Tech.8.2.12.E.4 Use appropriate terms in	Students will work together in small teams to solve problems and create and/or revise multipage documents for a professional audience. 8.1.12.A.2; 8.1.12.C.CS4 Students will be able to use a programming language to design and create a prototype using a design process, identifying constraints addressed during creation, updates made, and present	Establish, list, and manage activities to complete a project. (DOK 1-3) Students will work in small groups to identify a common idea for the final capstone project. (DOK 1) Students will be able to demonstrate a working knowledge of game development tools. (DOK 1) Students will modify the game design document to accurately reflect the team idea. (DOK 2)

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		conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements). TECH.8.1.12.B.2 - Apply previous content knowledge by creating and piloting a digital learning game or tutorial. TECH.8.1.12.C.CS4 - Contribute to project teams to produce original works or solve problems. TECH.8.2.12.D.1 - Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.	final product for peer review. 8.2.12.D.1; 8.2.12.E.3	The student will be able to verbally summarize the important considerations in game design. (DOK 2) Student will be able to integrate the principles of project management toward the completion of a basic project charter for the capstone project. (DOK 3) Students will be able to create a thorough and detailed written design document for the capstone project. (DOK 3) Students will critique the work of their peers. In small groups, students will apply concepts learned in previous units to create a working video game for final submission. (DOK 3) Students will create a 15 minute presentation illustrating the final game design document and working copy of game. (DOK 3) Create and control elements and simple scripts to perform specific actions within the Unity editor. (DOK 3) Within the Unity Editor, the students will be able to create basic structures for fully functioning discrete code. (DOK 4) Students will be able to create manipulate and transform animation controllers. (DOK 4) **Unit Terms:** Students will be able to identify the meanings of

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				the following: Pre-alpha, Alpha, Beta, Release candidate, versioning numbers, commercial distribution, shareware, constant shorthand code, batching, switch platform, player settings, Target platform, architecture, development build, web build settings, monetization