Course: Game Design in Unity - Semester Two I Module: Effects in Unity

Lesson 1.2: Cameras

https://codehs.com/course/14904/lesson/1.2

Description	In this lesson students learn about camera settings, angles, view frustums, and how multiple cameras can be used to provide players with top-down map views and two-player split screens.
Objective	Students will be able to: • Configure camera properties to optimize rendering and gameplay views • Create perspective and orthographic camera views • Create multiplayer split screen views
Activities	1.2.1 Video: Camera Projections 1.2.2 Notes: Download Tutorials 1.2.3 Free Response: Transform the Camera 1.2.4 Free Response: Change Camera Projection 1.2.5 Free Response: Follow a GameObject 1.2.6 Free Response: Top-Down View 1.2.7 Free Response: Player Two 1.2.8 Free Response: City Block
Prior Knowledge	• Adding GameObjects and configuring their properties. • Basic math skills to divide gameplay screen and scale camera views
Planning Notes	• Review Unity camera documentation • In this lesson, students download a Unity project file that's used throughout the activities. • This lesson may take students a couple class periods to complete.
Standards Addressed	
Teaching and Learning Strategies	**Lesson Opener:** • Have students brainstorm and write down answers to the beginning of class discussion questions listed below. Students can work

	individually or in groups/pairs. Have them share their responses. [5 mins]
	
	Activities:
	
	• Review *Camera Projections* slides. [5-10 mins]
	  ◦ Clarify the overall procedures for submitting Unity projects and submitting assignments with CodeHS as needed.
	• Complete the *Download Tutorials* activity and have students open the new project in Unity. [5 mins]
	  ◦ Ensure students are able to see the Tutorials window in Unity. If the Tutorials are hidden, instruct students to select Tutorials > Show Tutorials in the Unity menu bar.
	  ◦ Ensure students know how to access and navigate Unity documents as a resource.
	• Complete *Transform the Camera* Unity tutorial and free-response questions. [5 mins]
	• Complete *Change Camera Projection* Unity tutorial and free-response questions. [5 mins]
	• Complete *Follow a GameObject* Unity tutorial and free-response questions. [5 mins]
	• Complete *Top-Down View* Unity tutorial and free-response questions. [10 mins]
	• Complete *Player Two* Unity tutorial and free-response questions. [10 mins]
	• Complete *City Block* Unity tutorial and free-response questions. [10 mins]
	
	Lesson Closer:
	
	• Have students reflect and discuss their responses to the end of class discussion questions. [5 mins]

Discussion Questions	**Beginning of Unit:**
	
	• What do you think is your field of view (FOV) or a human's typical field of view might be in degrees? If you don't know look it up.
	  ◦ *Sample Response: Individually, our eyes have a horizontal FOV of about 135 degrees and a vertical FOV of just over 180 degrees. When the monocular fields of view are stitched together, our binocular FOV gives us around 114 degrees of view horizontally and is necessary for depth perception..*
	• How do you think your view or perspective within a video game might change how you play?
	  ◦ *Answers will vary, but students may discuss the need to view opponents or challenges that need to be completed within a game. What a player views in a game may impact how well they play or make decisions.*
	• When might you want to show more than one view within a game?
	  ◦ *Answers will vary, but student responses might include the need to show a map or top-down view. They may also*

	discuss the need to have split screens for multiple players in a single game.
	
	End of Unit:
	
	• Were you able to set up multiple cameras for different purposes? If not, what can you do to get assistance?
	  ◦ *If students are struggling with the cameras in Unity, you can direct them to the Unity documentation for assistance.*
	• How can you use orthographic camera views in a video game?
	  ◦ *Sample Response: Orthographic camera views can be used to show top-down or maps in the corner of a gameplay screen. They can also be used to create 2D games - specifically platformer games.*
	• Why is it important to understand clipping planes when using cameras in video games?
	  ◦ *Sample Response: Clipping planes can be used to optimize the game's graphics performance by preventing unnecessary over-rendering of GameObjects in the distance during gameplay. This helps games run on lower-performing hardware and can save on resources.*

Resources/Handouts	

Vocabulary

Term	Definition
transform	changing a geometric object's position or orientation within a space

Modification: Advanced	Modification: Special Education	Modification: English Language Learners
• Encourage students to assist others who may be have difficulty with Unity tutorials. • Instruct students to add other camera views to their gameplay screen and define a purpose for them. • Have students do their own research into video game screen layout design and present to the class or create a video.	• Refer students to the Unity Docs and review the slides as needed. • Pair students - one reads the directions and guides the other student through Unity tasks. • Some students may benefit from writing down their responses to the open-response item in the lesson prior to typing it into the CodeHS editor.	• Some students may benefit from writing down their responses to the open-response item in the lesson prior to typing it into the CodeHS editor. • Create a vocabulary list of lesson terms. • Provide an English dictionary or translation tool for unknown terms. • Pair students - one reads the directions and guides the other student through Unity tasks.