Lesson 4: Introduction to 3D Scenes in Godot

In this lesson, students will be introduced to the basics of creating and manipulating 3D scenes in Godot. They will learn how to navigate and manipulate a 3D scene in the Godot editor, create simple 3D scenes with objects and apply basic materials, as well as apply lighting and camera settings to enhance the 3D scene. Through hands-on activities and peer feedback, students will gain a deeper understanding of the key differences between 2D and 3D games, the role of materials in defining the appearance of 3D objects, the importance of lighting in creating realistic 3D scenes, and the purpose of a Camera node in a 3D scene. By the end of the lesson, students will have developed foundational skills in 3D game development using Godot.

**Objectives:**

- Understand the basics of creating and manipulating 3D scenes in Godot

- Learn how to navigate and manipulate a 3D scene in the Godot editor

- Create a simple 3D scene with objects and apply basic materials

- Apply lighting and camera settings to enhance the 3D scene

**Materials:**

- Computers with Godot Engine installed

- Projector or large screen for demonstration

- 3D models (optional)

## **Bell-Ringer Activity (5 minutes)**

- Display a 3D scene or a screenshot of a 3D game on the projector.

- Ask the students to discuss with their peers what they think are the differences between 2D and 3D games.

- After a few minutes, facilitate a class discussion and write down their responses on the board.

## **Introduction (10 minutes)**

- Explain to the students that today's lesson will focus on creating and manipulating 3D scenes in Godot.

- Discuss the differences between 2D and 3D games, highlighting the added dimension and depth in 3D games.

- Emphasize the importance of understanding 3D concepts and techniques for game development in a 3D environment.

- Introduce the concept of 3D scenes and explain that they are the foundation for creating 3D games in Godot.

## **Direct Instruction (20 minutes)**

- Demonstrate how to create a new 3D scene in Godot:

- Open Godot Engine and choose "New Scene" from the Scene dropdown in the top left of the screen.

- Explain the different 3D nodes available in the Node menu and their purposes (e.g., Spatial, MeshInstance, Camera, etc.).

- Show how to add and manipulate 3D objects in the scene by using the Transform tool and the Inspector panel.

- Explain the concept of materials in 3D scenes:

- Discuss how materials define the appearance of 3D objects, including their color, texture, and other visual properties.

- Show how to create and apply materials to 3D objects using the Material menu in the Inspector panel.

- Introduce lighting in 3D scenes:

- Explain the importance of lighting in creating realistic and visually appealing 3D scenes.

- Demonstrate how to add and configure different types of lights (e.g., DirectionalLight, PointLight) in the scene.

- Discuss camera settings in 3D scenes:

- Explain the role of the camera in defining the player's perspective in a 3D game.

- Show how to add and configure a Camera node in the scene, including adjusting the field of view and position.

## **Guided Practice (30 minutes)**

- Divide the students into pairs or small groups.

- Instruct each group to create a simple 3D scene using the techniques demonstrated.

- Encourage them to experiment with different 3D objects, materials, lighting, and camera settings.

- Circulate around the classroom to provide guidance and support as needed.

- Encourage students to collaborate and share their progress with other groups.

## **Independent Practice (20 minutes)**

- Ask each group to present their 3D scene to the class.

- As they present, have the other students provide constructive feedback and suggestions for improvement.

- Encourage the presenting group to explain their design choices and the techniques they used.

- Facilitate a class discussion on the different approaches and creative ideas presented.

## **Exit Ticket (5 minutes)**

- Distribute a short exit ticket to assess students' understanding of the lesson objectives.

- Example questions:

1. What are the key differences between 2D and 3D games?

2. How do materials affect the appearance of 3D objects?

3. Explain the role of lighting in creating realistic 3D scenes.

4. What is the purpose of a Camera node in a 3D scene?

## **Closure (5 minutes)**

- Recap the main points covered in the lesson, emphasizing the importance of understanding 3D concepts and techniques in game development.

- Encourage students to continue exploring and experimenting with 3D scenes in Godot to further enhance their skills.

- Thank the students for their participation and remind them of any upcoming assignments or projects related to 3D game development.