

# The VR Game World

## Web Development

**Time:** 60 mins

## Introduction

In this class, the student/s will learn to add a VR world to the game environment. Student/s will learn to add a camera to the world and move the character along with the camera using the arrow keys. Student/s will also learn to customize the game environment by adding additional entities like mountains, rocks, and pathways.

## JavaScript Commands Introduced

<ul style="list-style-type: none"><li>• <code>&lt;a-entity environment &gt;&lt;/a-entity&gt;</code></li></ul>	Adds an environment entity to the <code>&lt;a-scene&gt;</code> .
<ul style="list-style-type: none"><li>• <code>preset</code></li></ul>	A-Frame contains many presets which can be set using the <code>preet</code> property.
<ul style="list-style-type: none"><li>• <code>&lt;a-camera position="0 0 0"&gt;&lt;/a-camera&gt;</code></li></ul>	Adds a camera component to the scene. The position of the camera can be set along the x, y and z axes.
<ul style="list-style-type: none"><li>• <code>&lt;a-icosahedron&gt;&lt;/a-icosahedron&gt;</code></li></ul>	Adds a 20 sided icosahedron to the scene.
<ul style="list-style-type: none"><li>• <code>&lt;a-cone&gt; &lt;/a-cone&gt;</code></li></ul>	Adds a cone to the scene.
<ul style="list-style-type: none"><li>• <code>radiusBottom</code></li></ul>	Sets the bottom radius of a cone.
<ul style="list-style-type: none"><li>• <code>radiusTop</code></li></ul>	Sets the top radius of a cone.
<ul style="list-style-type: none"><li>• <code>segmentsRadial</code></li></ul>	Sets the number of segments at the bottom of the cone.

## Vocabulary

**VR Game World:** A realistic environment in which the game characters can move around

**preset:** A set of predefined and pre-created environment of VR worlds.

## Learning Objectives

Student/s should be able to:

- **Recognize** a 3-dimensional VR World from a 2-dimensional world
- **Demonstrate** how to add a VR world as an entity into a scene
- **Use** cones, icosahedrons, and boxes to customize the game environment.
- **Create** a customized VR world with a camera in which the character can move around.

# Activities

## 1. Class Narrative: (2 mins)

- Brief the student/s that a VR world can be created in which the character can move. A camera can be added and positioned such that it follows the character or any other object in the game. The VR world can also be customized by adding elements using 3-dimensional shapes.

## 2. Concept Introduction Activity: (5 mins)

- Let the student/s explore the VR World and move the character in the world using the arrow keys.
- Using the slides, explain that the student/s will learn:
  - to add a VR environment
  - to add a camera and rotate the character
  - to customize the VR world by adding mountains, rocks and paths.

## 3. Activity 1: Add Different World Templates: (7 mins)

### Student Activity: (7 mins)

- Guide the student/s to add the library <https://unpkg.com/aframe-environment-component/dist/aframe-environment-component.min.js> and an entity named environment to the scene.
- Let the student/s explore the different presets in the library *aframe-environment-component.js* by changing the value of the property preset.

## 4. Activity 2: Add Camera to the Game: (12 mins)

### Teacher Activity: (5 mins)

- Explain to the student/s how to add a camera to the scene.
- Explain to the student/s how the character can be added as a child node of the camera so that the camera would always follow the character when the arrow keys are moved.

### Student Activity: (7 mins)

- Guide the student/s to add a camera entity to the scene and position it at eye level.
- Guide them to rotate the character by 180° so that the character would be viewed as running towards the forest/environment.

Probing question:

Expected answer:

## 5. Activity 3: Customize the Game Environment: (20 mins)

### Teacher Activity: (5 mins)

- Explain to the student/s how different shapes can be used to add elements so that the game environment can be customized.
- Demonstrate to the student/s how a cone can be used to add a mountain, an icosahedron can be used to add a rock and a box can be used to add a path in the scene.

### Student Activity: (5 mins)

- Guide the student/s to add two mountains, a rock, and a path using 3-dimensional shapes.

### Teacher Activity: (5 mins)

- Explain to the student/s multiple cones can be added under an entity to create a cluster of mountains so that they can be scaled and positioned together.

**Student Activity: (5 mins)**

- Guide the student/s to create position, scale, and set the height of a cluster of mountains added as an entity.
- Guide the students to position the rocks so that they lie scattered in the scene.

**6. Introduce the Post class project: (2 min)**

- Add a customized environment to the VR game world.

**7. Test and Summarize the class learnings: (5 mins)**

- Check for understanding through quizzes and summarize learning after respective missions.
- Summarize the overall class learning towards the end of the class.

**8. Additional activities:**

- Encourage the student/s to add a VR environment and a drone camera to the game scene.
- Encourage the student/s to construct a mace using 3-dimensional shapes. Guide the students to make multiple copies of the mace in the VR world.

**9. State the Next Class Objective: (1 min)**

- We will learn to animate the environment and the game character.

## U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13,2-AP-14

Links Table		
Activity	Activity Name	Link
Class Presentation	VR Game World	<a href="https://s3-whjr-curriculum-uploads.whjr.online/6a734289-bf7a-48cd-907f-592a7931ddb1.html">https://s3-whjr-curriculum-uploads.whjr.online/6a734289-bf7a-48cd-907f-592a7931ddb1.html</a>
Explore Activity	Explore the VR Game World	<a href="https://tynker.com/code/view/63e0e15c4fe6f55e684fb067/">https://tynker.com/code/view/63e0e15c4fe6f55e684fb067/</a>
Student Activity 1	Add a World Template	<a href="https://tynker.com/code/project/63e0b7ac3ba9322644455532">https://tynker.com/code/project/63e0b7ac3ba9322644455532</a>
Teacher Reference: Student Activity 1 Solution	Add a World Template - Solution	<a href="https://tynker.com/code/project/63e0b7179e6a4d36f23e1352">https://tynker.com/code/project/63e0b7179e6a4d36f23e1352</a>
Teacher Activity 2	Add Camera	<a href="https://tynker.com/code/project/63e0baed9ee1944c741a7672">https://tynker.com/code/project/63e0baed9ee1944c741a7672</a>
Teacher Activity 2 Solution	Add Camera - Solution	<a href="https://tynker.com/code/project/63e0ccad6d6bb44d413a2ed2">https://tynker.com/code/project/63e0ccad6d6bb44d413a2ed2</a>
Student Activity 2	Add Camera and Rotate the Character	<a href="https://tynker.com/code/project/63e0cf6ad302e61caf69c242">https://tynker.com/code/project/63e0cf6ad302e61caf69c242</a>
Teacher Reference: Student	Add Camera and Rotate the	<a href="https://tynker.com/code/project/63e">https://tynker.com/code/project/63e</a>

Activity 2 Solution	Character - Solution	<a href="https://tynker.com/code/project/63e0ce809321266b8a0b9c82">0ce809321266b8a0b9c82</a>
Teacher Activity 3.1	Add Additional Objects to the Game World	<a href="https://tynker.com/code/project/63e0db621179973857068eb2">https://tynker.com/code/project/63e0db621179973857068eb2</a>
Teacher Activity 3.1 Solution	Add Additional Objects to the Game World - Solution	<a href="https://tynker.com/code/project/63e0d9116c741b5d3238e742">https://tynker.com/code/project/63e0d9116c741b5d3238e742</a>
Student Activity 3.1	Customize the Game Environment	<a href="https://bfs-dev.tynker.com/code/project/63e0ddd206bb3b6b4d60d472">https://bfs-dev.tynker.com/code/project/63e0ddd206bb3b6b4d60d472</a>
Teacher Reference: Student Activity 3.1 Solution	Customize the Game Environment - Solution	<a href="https://tynker.com/code/project/63e0dbcdab03f15a74373f92">https://tynker.com/code/project/63e0dbcdab03f15a74373f92</a>
Teacher Activity 3.2	Create a cluster of mountains	<a href="https://tynker.com/code/project/63e0e063be76fa2cb87cd9f2">https://tynker.com/code/project/63e0e063be76fa2cb87cd9f2</a>
Teacher Activity 3.2 Solution	Create a cluster of mountains - Solution	<a href="https://tynker.com/code/project/63e0de858b5b42330d705612">https://tynker.com/code/project/63e0de858b5b42330d705612</a>
Student Activity 3.2	Position the Mountains and Rocks	<a href="https://tynker.com/code/project/63e0e28519ee730430072072">https://tynker.com/code/project/63e0e28519ee730430072072</a>
Teacher Reference: Student Activity 3.2 Solution	Position the Mountains and Rocks- Solution	<a href="https://tynker.com/code/project/63e0e15c4fe6f55e684fb067">https://tynker.com/code/project/63e0e15c4fe6f55e684fb067</a>
Student's Additional Activity 1	Add a VR World	<a href="https://tynker.com/code/project/63db6f163eca6c78e61f2332">https://tynker.com/code/project/63db6f163eca6c78e61f2332</a>
Teacher Reference: Student's Additional Activity 1 Solution	Add a VR World - Solution	<a href="https://tynker.com/code/project/63db6ef47c68f93d846af7a2">https://tynker.com/code/project/63db6ef47c68f93d846af7a2</a>
Student's Additional Activity 2	Add Obstacles in the Path	<a href="https://tynker.com/code/project/63db6eaa733f543c355338b2">https://tynker.com/code/project/63db6eaa733f543c355338b2</a>
Teacher Reference: Student's Additional Activity 2 Solution	Add Obstacles in the Path- Solution	<a href="https://tynker.com/code/project/63db69d7d179aa36cf1671f2">https://tynker.com/code/project/63db69d7d179aa36cf1671f2</a>
Post Class Project	The Target Range	<a href="https://tynker.com/code/project/63dc8fde6cd5266f671be547">https://tynker.com/code/project/63dc8fde6cd5266f671be547</a>
Teacher Reference: Post Class Project Solution	The Target Range - Solution	<a href="https://tynker.com/code/project/63dc8e8158c2cf44921139a2">https://tynker.com/code/project/63dc8e8158c2cf44921139a2</a>