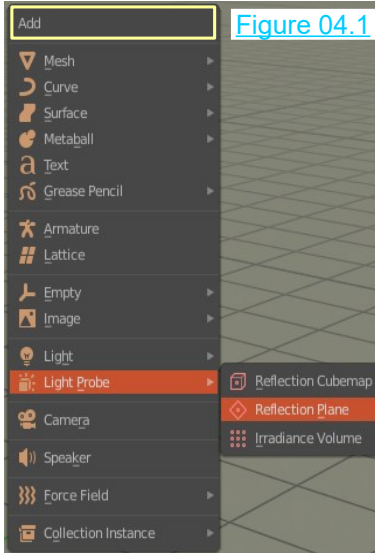# 04 Reflection Plane
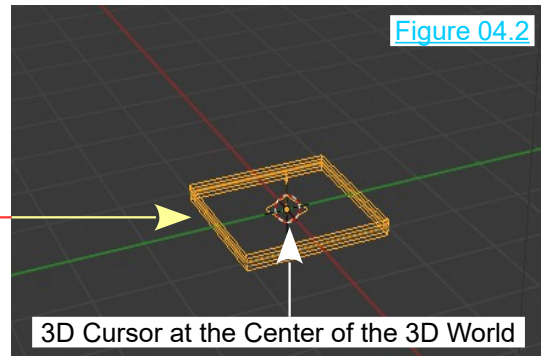
The **Reflection Plane Light Probe** is a mesh tool that produces a mirror like reflection.



Figure 04.1



Figure 04.2

3D Cursor at the Center of the 3D World

A Reflection Plane – Light Probe is added to a Scene from the **Add Menu** (Figure 04.1).

The Reflection Plane – Light Probe is entered into the Scene, by default, at the center of the 3D World or at the location of the 3D Cursor. In either case it is on the X-Y Plane of the Scene (Figure 04.2).

The Reflection Plane – Light Probe may be selected and **Translated, Scaled and Rotated** like any other Object in Blender.

Figure 04.3 shows the Light Probe rotated about the Y-Axis and scaled up **four times**. The Light Probe remains at the center of the Scene. A UV Sphere has been added, set to Smooth Shading and given a bright red Material color. The UV Sphere is positioned forward along the X-Axis in front of the Light Probe. Figure 04.3 shows the arrangement with the Scene in Solid Viewport Shading mode. Figure 04.4 shows the Scene in LookDev Viewport Shading mode.
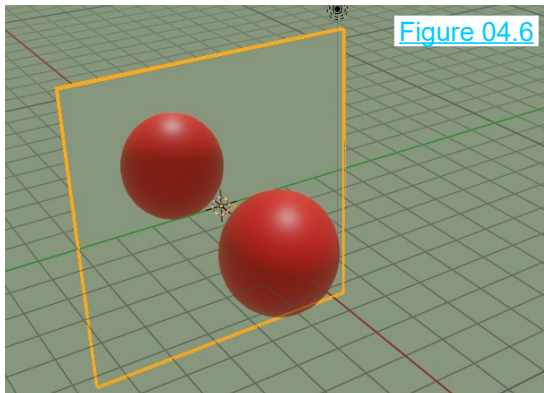


Figure 04.3



Figure 04.4
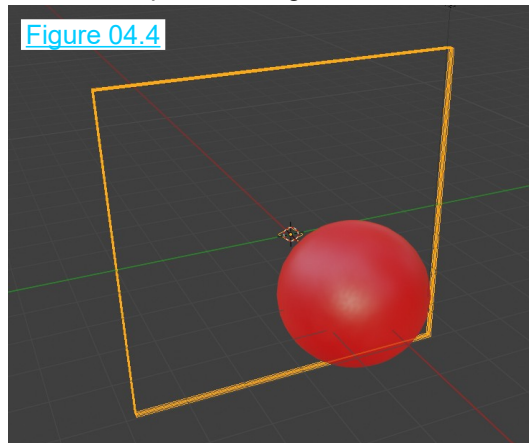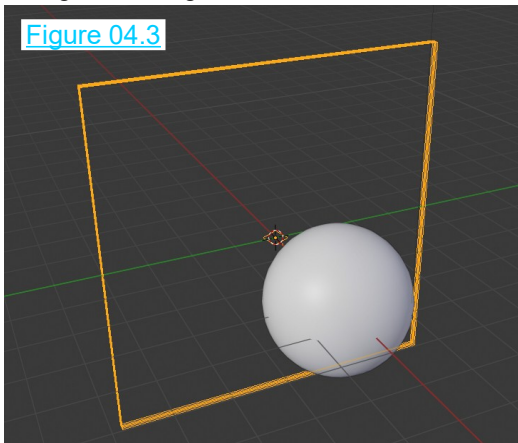
At this point the display on the Screen merely shows the Objects displayed with a default background ambient illumination. The default Lamp in the Scene has no effect.

Reflection is what you see when light rays deflect off a surface. Solid Viewport Shading mode allows you to quickly position Objects with a minimal demand on computer power. LookDev Viewport Shading mode allows you to see Material colors and depending on the Shading Options, see the effects of different lighting. True reflection is only visible in Rendered Viewport Shading mode.

To make the display a little more interesting change the **World Background** to a brighter color (Figure 04.5). To see the color you will have to be in LookDev Viewport Shading mode with **Scene World Lighting** selected in the Options or be in Rendered Viewport Shading mode.



Olive Green World Background

Properties Editor

Figure 04.5

World buttons
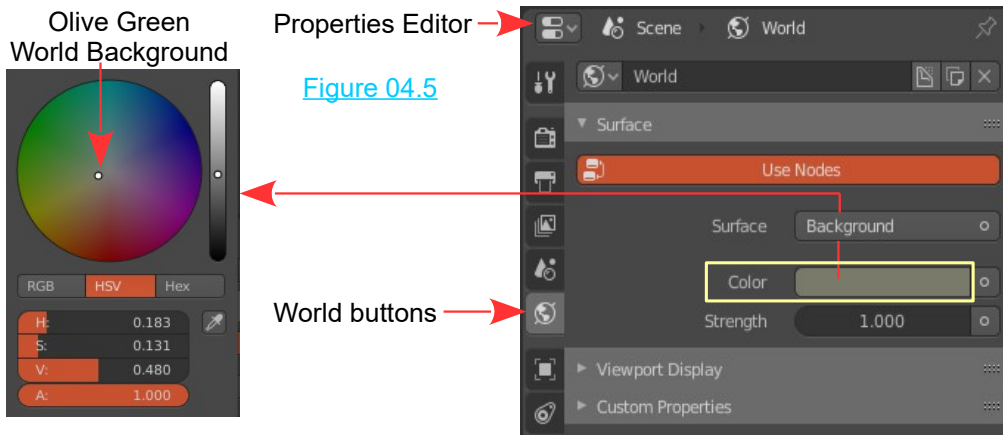
With the World Background changed and the Scene in **Rendered Viewport Shading mode** (Eevee Render engaged) the UV Sphere is shown reflected in the Light Probe (Figure 04.6). Moving the UV Sphere moves the reflection as does rotating or moving the Light Probe.



Figure 04.6

With Rendered Viewport Shading engaged the Scene is illuminated by the default Point Lamp. You may change to any of the alternative Lamp types.

**Note:** Figure 04.6 shows the Scene in Camera View (Num Pad 0 - Camera Repositioned). By pressing F12 on the Keyboard you will get a Rendered View but you will be disappointed to find that the reflection in the Light Probe, **does not Render.**

At this point you should be aware that the Reflection Plane, Lightprobe is not intended as a tool for simulating mirrors as such, but rather a tool for creating mirror like reflections. The following procedure will explain.

**Note:** Hereafter in this exercise the **Reflective Plane – Light Probe** will be referred to as the **Light Probe.**

With the Scene previously constructed, as shown in Figures 04.3 and 04.4 and arranged to show Camera View Figure 04.6 in **Rendered Viewport Shading mode,** in the **Outliner Editor,** click the **eye icon** adjacent to **Reflection Plane** (Figure 04.7) to hide the Light Probe in the viewport. Doing this cancels the mirror reflection of the UV Sphere.



Figure 04.7

Click the **Eye Icon**

**Note:** When the Light Probe was entered in the Scene at the center of the 3D World, it was rotated 90° about the Y Axis and Scaled up four times.

With the **Light Probe** cancelled in the Scene, add a new Plane Object at the center of the 3D World. Rotate the new Plane 90° about the Y Axis and scale up four times such that it coincides exactly with the hidden Light Probe in 3D Space (Figure 04.8).
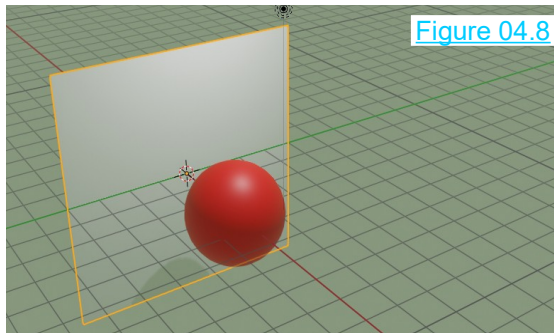


Figure 04.8

Give the new Plane a Material. Leave the default Surface, Principled BSDF settings except change Metallic to 1.000 and Roughness to 0.000 making it a reflective Object.

In the **Properties Editor, Render buttons** check **Screen Space Reflections**.
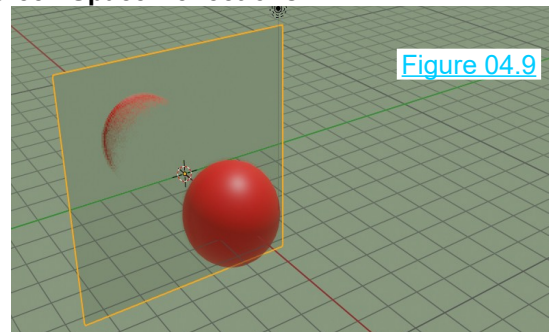


Figure 04.9

With **Screen Space Reflections** checked a reflection of the UV Sphere displays on the surface of the new Plane as seen in Figure 04.9. The reflection is incomplete and of poor quality. The reflection can be greatly improved and controlled by using the Reflection Plane – Light Probe.

Cancel (uncheck) **Screen Space Reflections** in the render buttons. The reflection disappears.

Figure 04.10

In the **Outliner Editor** reinstate the Light Probe by clicking the eye icon adjacent to **Reflection Plane,** then, still in the Outliner Editor, click on **Reflection Plane** to **have the Light Probe selected in the 3D View Editor.**



In the **Properties Editor** open the **Object Data buttons** for the Light Probe (Figure 04.10).

Have the **3D View Editor** in **User Perspective View** in **Rendered Viewport Shading mode.**
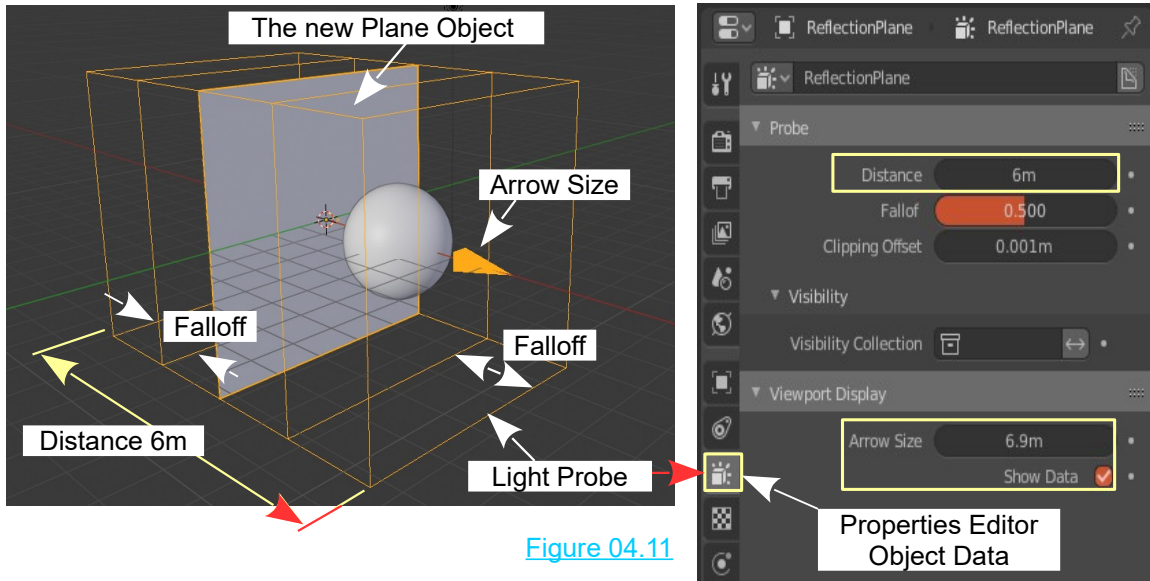
The new Plane Object
Arrow Size
Falloff
Falloff
Distance 6m
Light Probe

Figure 04.11

Properties Editor
Object Data
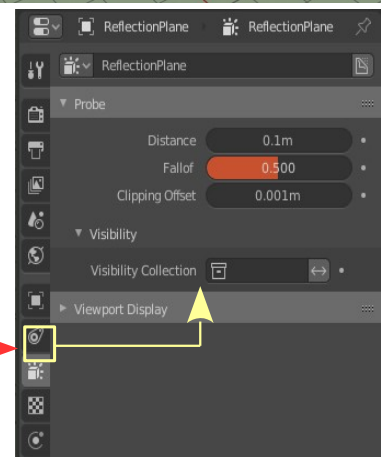
In the **Object Data** buttons for the Light Probe, increase the **Distance** value to 6m and have the Viewport Display Tab open with **Show Data** checked. Increase the **Arrow Size** value.

With the settings changed the Light Probe is expanded as shown in Figure 04.11 (Solid Viewport Shading).

**Note:** The **Distance** value 6m is an arbitrary value and the default **Falloff** value is one half of half (¼) the Distance. The Arrow size is arbitrary and merely indicates direction.

**The significance of the Arrow:** Objects positioned on the Arrow side of the Plane Object will be reflected. The Arrow **Size** does not appear to have significance.

In Rendered Viewport Shading mode there is no reflection (Figure 04.12) and rendering a View shows only the UV Sphere and  the new Plane with no reflection (Figure 04.13).
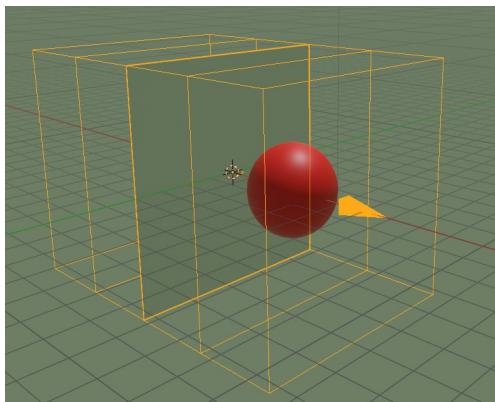


3D Viewport      Figure 04.12
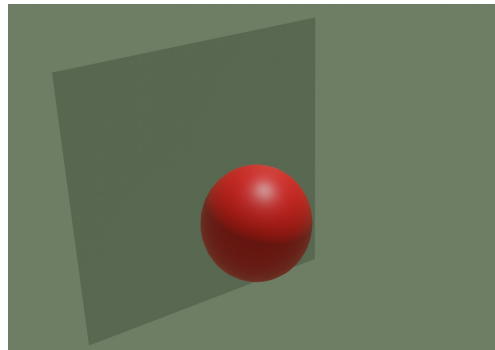


Rendered View    Figure 04.13

To produce a reflection of the UV Sphere select the new Plane and move it in a negative direction along the X Axis of the Scene. You can move the new Plane by clicking the slider in the Object Properties Panel (N Key to display – Figure 04.14)
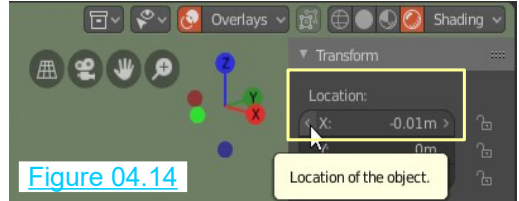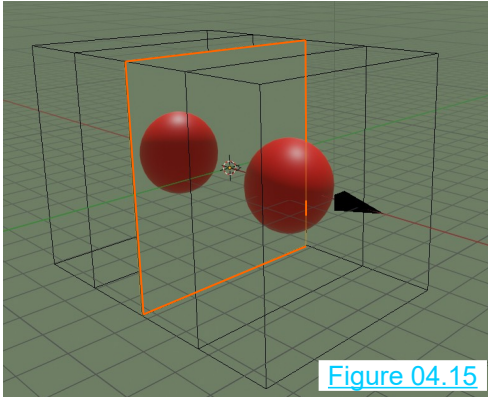


Figure 04.14

With the slightest movement in the negative direction a reflection of the UV Sphere appears (Figure 04.15).

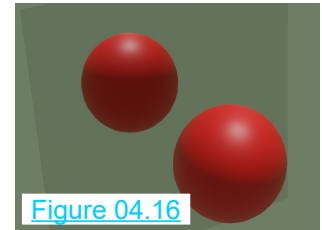Rendering the Scene also shows the reflection (Figure 04.16).

Make note that the reflection is being generated on the new Plane.



Figure 04.15



Figure 04.16

The new Plane is, therefore, the Reflecting Plane and consequently, how it is positioned in Camera View affects what you see when the Scene is Rendered.

To have the Reflection Render, the Reflective Plane does not have to be totally within the bounds of the Light Probe on the Y or Z Axis but it must be behind the center of the Light Probe on the X Axis (behind the Clipping Offset – Detail to follow).
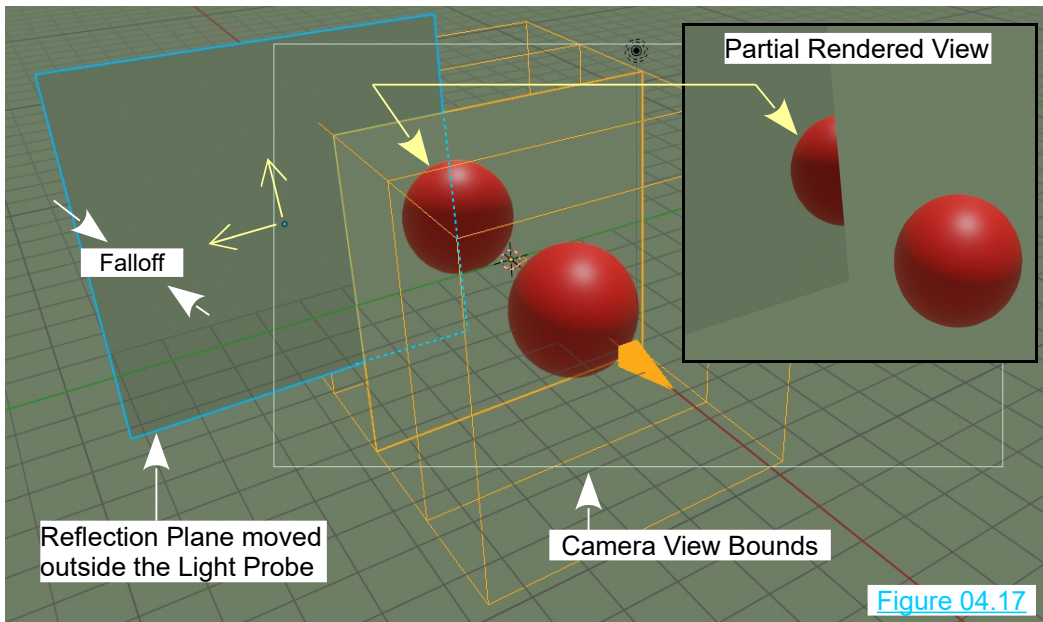


Partial Rendered View

Falloff

Reflection Plane moved outside the Light Probe
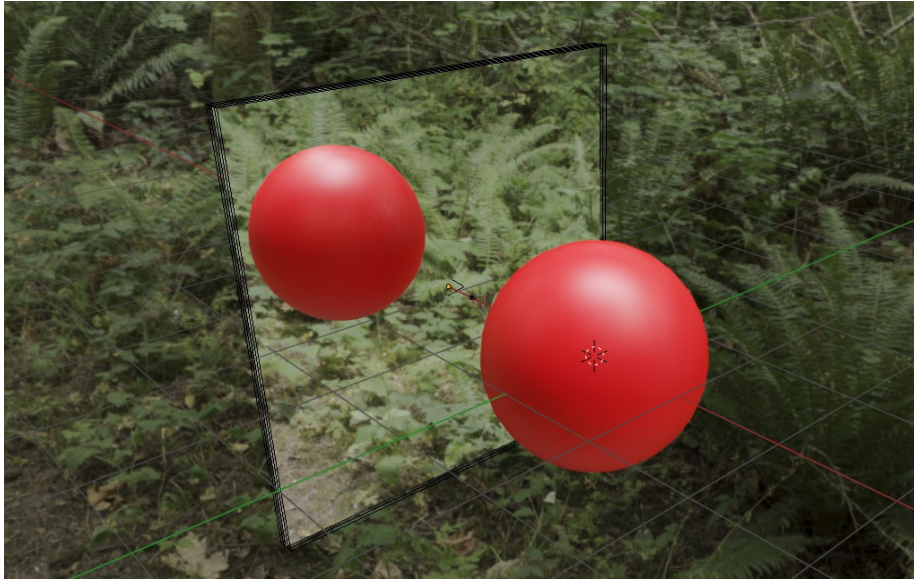
Camera View Bounds

Figure 04.17

**Fading Reflection -** When the Reflection Plane is moved into the Falloff area of the Light Probe, the Reflection progressively fades, the further back the Plane is moved.



Fadded Reflection

Partial Rendered View

The Fading is only seen when the Scene is Rendered

Figure 04.18
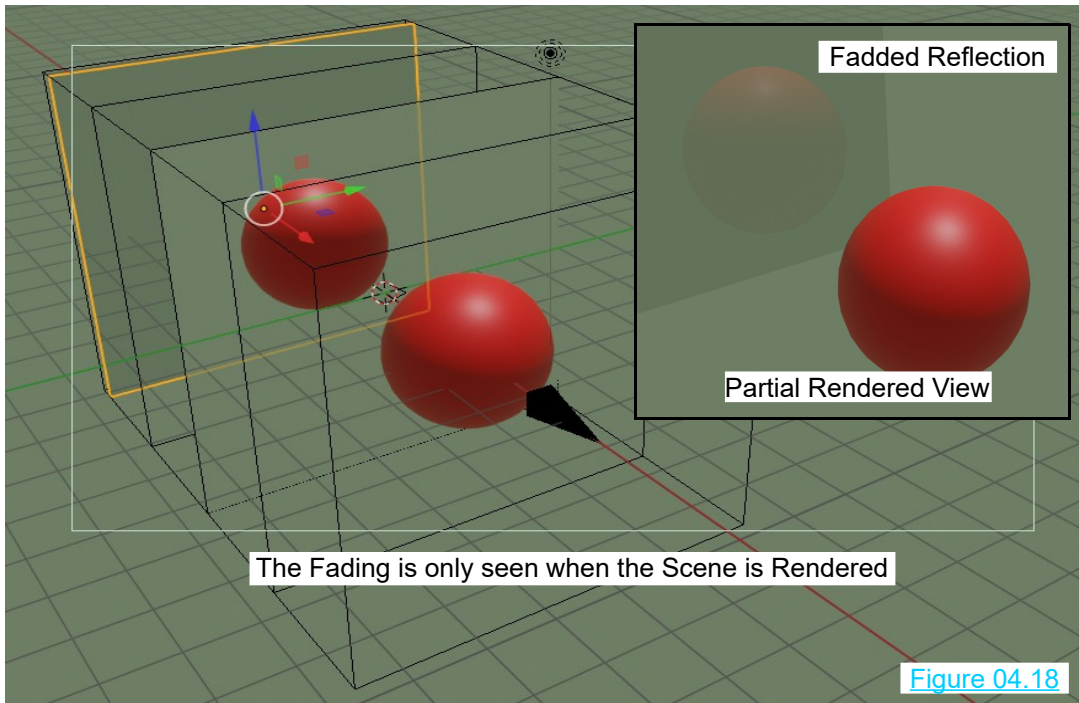
**Remember:** The Distance (length of the Reflection Plane Light Probe) and the proportion of the Falloff area are adjustable in the Properties Editor, Object Data buttons. There is also a **Clipping Offset.** The default Clipping Offset is 0.001m which places it practically at the center of the Light Probe. This is the reason for moving the Reflective Plane in a negative direction to produce a Reflection. The Clipping Offset may be repositioned. With the Offset at 1.7m as shown in Figure04.19 the Reflective Plane would have to be at -1.7049 on the X Axis to have reflection.



Clipping Offset -1.7m

Reflective Plane -1.7049
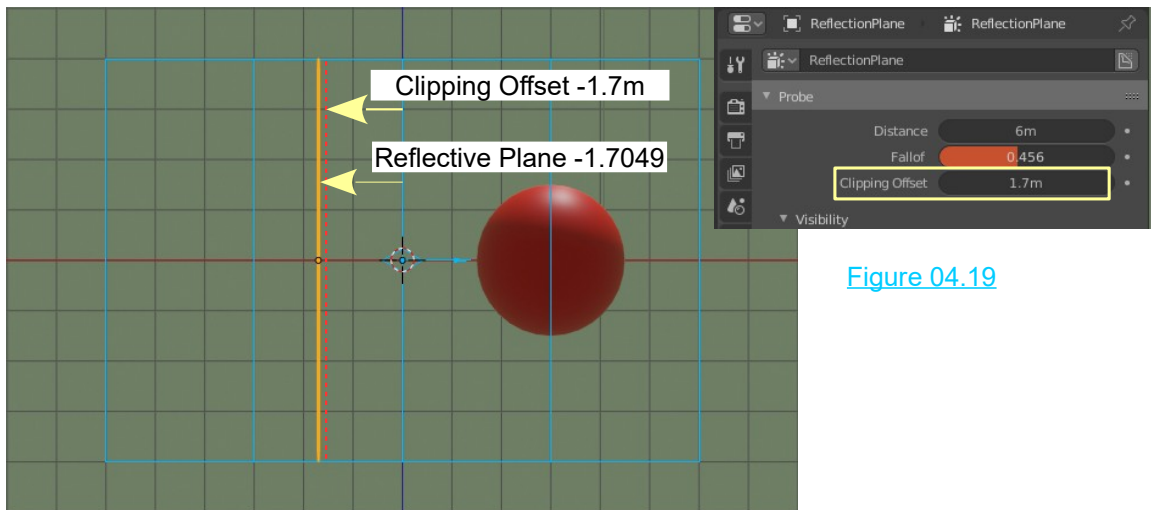
Figure 04.19

To really jazz up the Scene change the Background color to an Environmental Texture HDRI Map. Click **Open** and select a HDRI Image (Figure 04.20).

Figure 04.20 shows the Scene with an HDRI Image of a forest as the background and with part of the background reflecting in the Reflective Plane behind the reflection of the UV Sphere.

The Reflective Plane Light Probe has not been expanded.

Remember, when HDRI Images are used, illumination is provided by the image.