Facing Ratio Ramp Technique
For most highly polished, metallic painted cars, reflectivity actually decreases as the surface turns and faces the viewer. This is what allows all the sparkly, shiny bits to show to the viewer. We will add those bits when we add the color component later in the tutorial. For right now, however, we want to make the surface facing us less reflective. We will do this by using the Facing Ratio attribute of the sampler info node.

The sampler info node samples points on a surface as they are rendered. This sampling information is expressed in a whole host of attributes contained in this node; we will use **Facing Ratio**. Figure 1 illustrates the concept of the Facing Ratio attribute. All polygon and NURBS surfaces have normals that extend out from the model. The sampler node derives Facing Ratio by comparing the angle of view from the camera to the normal as it extends from the object. If the normal is perpendicular to the angle of view, the surface is facing away from the camera and Facing Ratio reads 0.0. If the angle of view is parallel to the surface normal, the surface is facing directly toward the camera, and Facing Ratio reads 1.0.

Let’s explore this on your model as follows.
1. In the Hypershade, create a ramp with black at the top and white at the bottom. Note that Maya defaults to creating a V ramp. Leave Interpolation set to Linear. Name it RefTweak_rmp
2. Scroll down to the General Utilities section of the Create Bar, and click the Sampler Info button to create a node in the Hypershade.
3. Hold down the Shift key and MM drag the sampler info node over the ramp you just created to open the Connection Editor.
4. Connect the Facing Ratio attribute of the sampler info node to the V Coord attribute under the grayed-out UV Coord input of RefTweak_rmp, as shown in the figure below (Figure 2a):

![Figure 1: A normal pointing away from the camera (top arrow) has a 0.0 Facing Ratio, and one pointing toward the camera (arrow pointing right) has a 1.0 Facing Ratio.](image)
5. Select RefTweak_rmp in the Hypershade, and click the Reload Left button at the top of the Connection Editor to load the ramp into the Output side of the window.

6. Select your shader in the Hypershade and click the Reload Right button in the Connection Editor to load it into the CE.

7. Connect the Out Alpha attribute of RefTweak_rmp to the Reflectivity attribute of your shader. This means that the reflectivity of your shader will change based on whether it faces toward or away from the render camera. Map an image (in this case the White House) into an Environment Ball node and pipe it into the Reflected color channel of your shader to see the effect in action if you don’t have any objects in your scene.
8. Manipulate the two handles of the ramp to get the effect you want. Figure 3 shows some rendered examples created from manipulating the ramp handles. If you want to make the edges less reflective, change the white of the ramp to a shade of gray.

This technique is extremely powerful. With it, you can control much more than just reflectivity. Imagine making glass that is less transparent, reflective, and refractive depending on how it faces the camera. You can use this technique to control color or any attribute that might depend on which way it is facing in relation to the camera.