Lights

Illuminating Your 3D World

Section 7.1 – Introduction

Unless you live in a cave, light permeates your world. It is literally all around us. When we see objects in the world what we are sensing is light reflected from the surface of that object. The light hits our eyes, is focused to our retina and then absorbed by our photoreceptors. This sets off an intricate chemical reaction that starts a synapse along the optical nerve which eventually makes its way back to the visual cortex in the occipital lobe. And the entire process all begins with light.

So why is all this relevant? It is light that gives life to the world around you. In the same way, the light in your 3D scene gives it life. Whether you want your image to look warm and vibrant, or cold and dark you need light to make this happen. The lighting in your scene helps tell your story just as much as the figures do. Humans are very intuitive, even someone who isn't a trained artists will be able to spot bad lighting in a render.

This chapter will teach you about the different types of lights available in DAZ Studio and how to load them into the scene. We'll go over the Lights Pane, properties specific to lights and how to edit those properties. Finally we'll discuss techniques to set up lighting in your scene. Keep in mind that for this chapter we'll still be in the Lights & Cameras activity in the Hollywood Blvd Interface Layout.
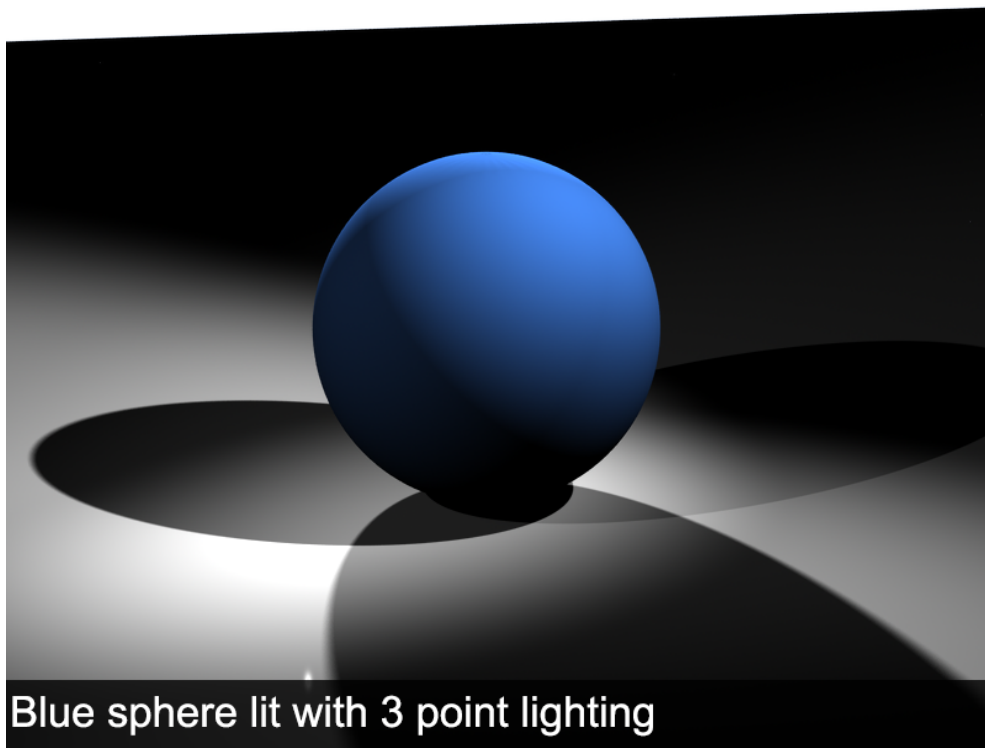
Blue sphere lit with 3 point lighting

Section 7.2 – DAZ Studio Default Lighting

Many of you may be wondering why you need to light the scene. In the renders we've done so far in this manual everything has been lit. This is because DAZ Studio uses a type of default lighting called "Headlamp" lighting. Essentially your view is lit by an imaginary headlamp. DAZ Studio uses headlamp lighting when no other lights are loaded in the scene. Head lamp lighting is great to help you preview and set up your scene. Everything you look at will be perfectly illuminated. However, headlamp lighting isn't realistic. When you do your final render you'll need a different light set up to make the lighting look natural.

When you load a light into your scene DAZ Studio turns off headlamp lighting, and the lighting in the viewport is comes from the light(s) in the scene. The number of lights that can be previewed in the viewport is determined by your video card. Most video cards can preview up to 8 lights.

Being able to preview the current scene lighting is a great way to get a feel for how the lighting will look in the final render. However, there may be times when you'd like to switch back to headlamp lighting for your preview. Perhaps you are trying to move figures in a dimly lit area of the scene. You can switch back to headlamp lighting by toggling the Use Scene Lights tool in the tool bar. When the icon is highlighted DAZ Studio will display the preview using the current scene lighting. If the icon is grey DAZ Studio will display the scene using headlamp lighting.

Note: In Chapter 7 we will continue using the Lights & Cameras Activity.

Section 7.3 – Adding a Light

New lights can be added to the scene using the actions in the Create menu. DAZ Studio has four distinct types of lights – Distant Light, Spotlight, Point Light, and Linear Point Light. We will discuss each light type later in this section. Each light has its own action in the create menu. To load a light choose that light's action in the create menu. For example to load a distant light go to Create → New Distant Light…
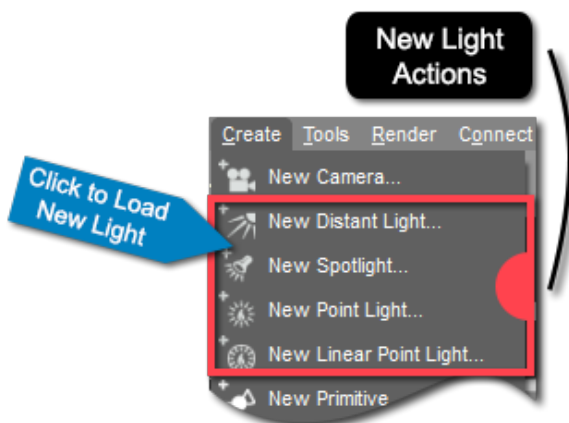
Choosing any of the New Light actions will launch the Create New Light dialog. If this dialog looks familiar it is because it uses the exact same interface as the Create New Camera dialog introduced in Chapter 6. In this dialog you can name your new light. It is generally best practice to name the light according to its function (i.e. Key Light, Rim Light, Flood Light, Fill Light etc.). This will allow you to quickly identify each light by its function in the Scene Pane.

If you click the Show Options>> button the dialog will expand to reveal more load options for the light. You can choose to load the light at the default load location, or to apply the Active Viewport Transforms. Choosing the latter will load the light at the position and angle of the current active viewport. Once you are satisfied with your settings click Accept to load the light.

As the light loads into the scene you should notice a drastic change in the lighting as headlamp lighting is turned off and DAZ Studio displays the preview using the light you just loaded. If you look in the Scene Pane you will see your light listed. Lights are selectable objects in your scene; they can be manipulated just like any other object.
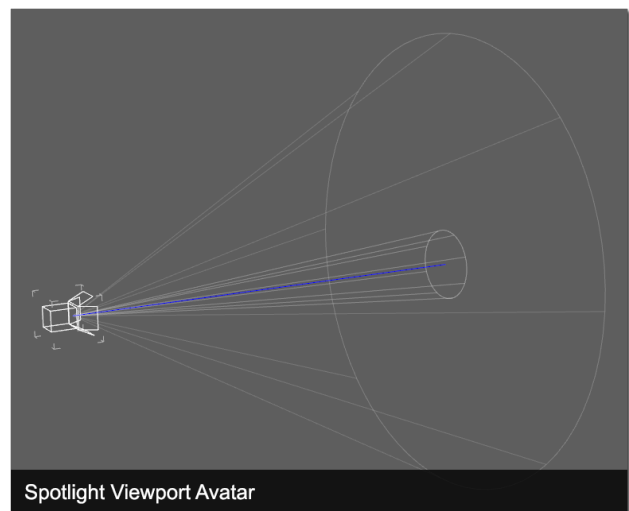
7.3.1 – Distant Lights
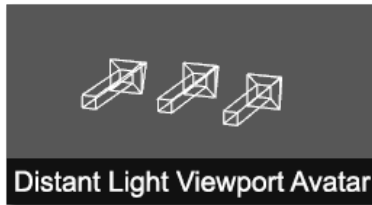
A distant light acts a light source from an infinite distance. In some 3D applications it is referred to as an infinite light. Because the light source is from an infinite point away translation is irrelevant for a Distant Light. The only thing that is important is the rotation of the light as that determines the direction from which the light is coming. The arrows of the Distant Light Viewport Avatar indicate the light's direction.

Distant lights are great at illuminating large portions of the scene. Often they are used to mimic sunlight. Try loading a distant light into your scene and playing around with the rotation to see how the light behaves. As you familiarize yourself with the distant light you will find plenty of uses for it.

7.3.2 – Spotlights

Spotlights are useful for illuminating specific areas of your scene. Just as in the real world, a spotlight in DAZ Studio emanates in a cone shape. This means that both the translation and rotation of the spotlight determine where the light shines.

Spotlights are great at mimicking things like car headlights, open face lamps, flashlights, and of course spotlights. The latter may sound facetious, but keep in mind that spotlights are common in photo shoots. Don't underestimate the usefulness of a spotlight when illuminating your scene.

7.3.3 – Point Lights

Point lights function much like a light bulb, or a candle. A point light is a single point in 3D space that emanates light. Unlike the distant light where only rotation is important, point lights aren't affected by rotation since light emanates in all directions from the point. Instead, point lights are affected by translation. You can use the translation properties for the light to change where the light emanates from.

Point lights don't have much intensity to them, so it is difficult to light an entire scene with just a point light. Point lights are great for candles, light bulbs, chandeliers. It is possible to light an entire scene with point lights, but it is much easier to use point lights to accent your existing.

Point Light Viewport Avatar

Linear Point Light Viewport Avatar
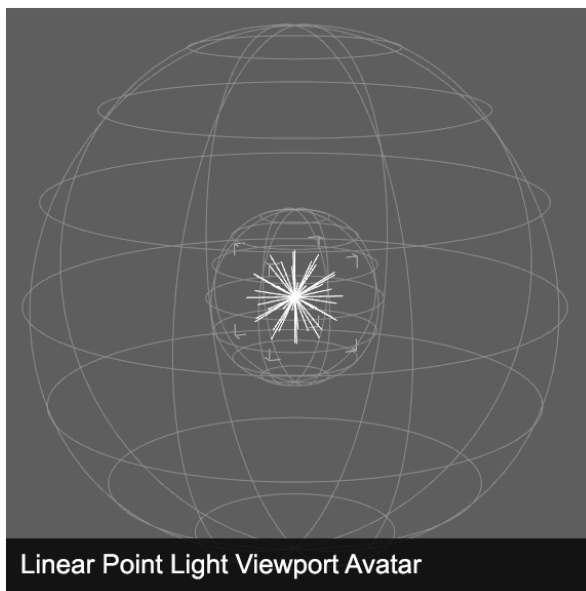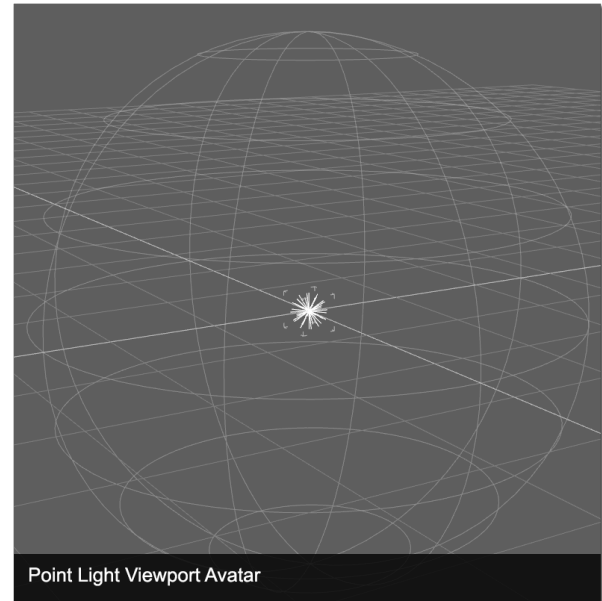
7.3.4 – Linear Point Lights

Linear Point Lights are similar to Point Lights in that there is a single point in 3D space and light emanates from that point. The difference between the two is that while a Point Light follows the physical laws of light (the intensity of light is inversely proportional to the square of the distance from the source). A linear point light doesn't follow these laws. Instead it allows you to set the point at which the light falls off. This allows you to have the effect of a point light, but at a much higher intensity.

Section 7.4 – The Lights Pane

The Lights Pane is where you can customize each of the lights in your scene - adjust color, intensity, position and other properties. You can also use the Lights Pane to load Light(s) Presets. The Lights Pane is located on the left hand side of the Hollywood Blvd interface layout inside the Lights & Cameras activity.

Hopefully, the first thing that you notice about the Lights Pane is that it is similar to the cameras pane, posing pane and surfaces pane. The Pane is broken down into two pages – the Editor Page and the Presets Page. The Editor Page is where you can manipulate the properties for each light. In the Presets Page you can load premade Light(s) Presets.

7.4.1 – The Editor Page

The Editor Page is divided into two columns. In the left hand column, the Property Group View, is a list of all the property groups for the currently selected light. If you don't have a current scene selection or if your current scene selection is not a light then nothing will be displayed in this column. (If you haven't loaded a light yet take the time to do so now and select it in the scene pane). In the right hand column or Property View you will find a list of individual properties. The properties displayed on the right are determined by the property group that is selected on the left.
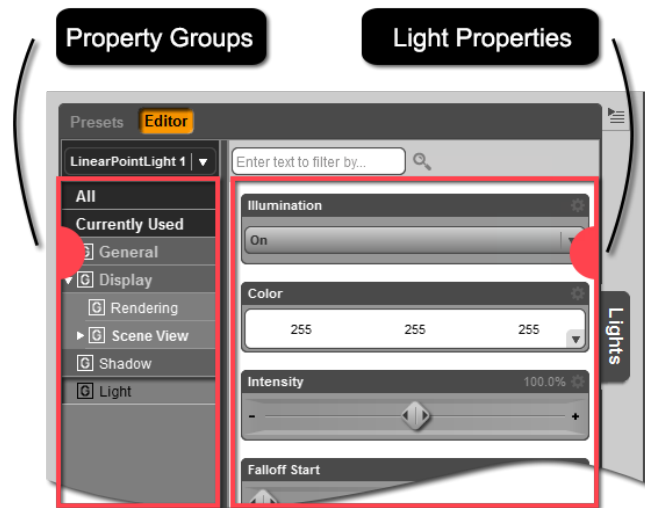
Each light has four property groups – General, Display, Shadow and Light. The General property group is where you will find transform properties. The Display property group is where you can toggle scene visibility of the light in preview and in render. The Shadow property group has properties that affect the shadows cast by the light. The Light property group has properties that affect the light such as color and intensity. We will discuss important properties in the Shadow and Light property groups later in this section.
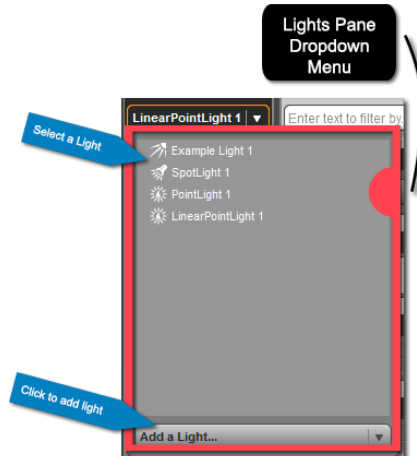
The left column has options to display all properties for the selected light. This is accomplished by clicking "All" in the left hand column. The "Currently Used" filter in the left column will display only properties that have been modified.

You can change your light selection and load a new light using the Lights Pane. The drop down menu above the left column will list every light in the scene. Clicking the drop down allows you to select a light from the menu. At the bottom of the drop down menu is an option to "Add a Light." This is a further drop down menu with actions to load each of the lights.

Shadow Type

Shadow Type is a property found in the Shadow property group. By default each light loads without a shadow. When Shadow Type is set to "None" the light won't cast a shadow. If you want your light to look natural it should cast shadows.
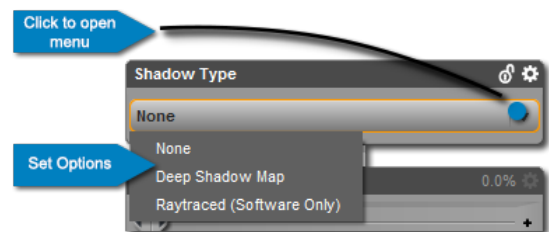
There are two types of shadows to choose from in the Shadow Type property – Deep Shadow Map and Raytraced (software only). A Deep Shadow Map provides a quick and dirty shadow. Renders will be faster with a Deep Shadow Map, but the quality of the shadows will be low. This option

should only be used for preview renders, or on lights that have little effect on the focus of the scene.

Raytraced shadows are calculated by the render engine. These shadows will appear just as they would in the natural world. The shadow is determined by the size of the object casting the shadow and its relative position to the light. Raytraced shadows take longer to render, but the results are worth it. This option is a must for lights illuminating the focus of your scene.

Note: Shadows must be cast on something. Make sure you have a ground plane, or other geometry in your scene to cast shadows on.

Shadow Softness

Shadow softness determines how hard or soft the shadows are. A soft shadow will be fuzzy or blurry around the edges, while a hard shadow will have a distinct shape. Higher values for Shadow Softness mean softer the shadows. These two images show the difference between a hard and soft shadow.
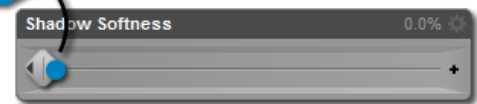
You can manipulate the Shadow Softness Property by using the slider available. Click on the slider and drag left or right to change the value. You can also enter a numeric value by clicking the current value and entering a value into the numeric value field. Shadow softness is found in the Shadow property group.

Hard Shadows Example   Soft Shadows Example
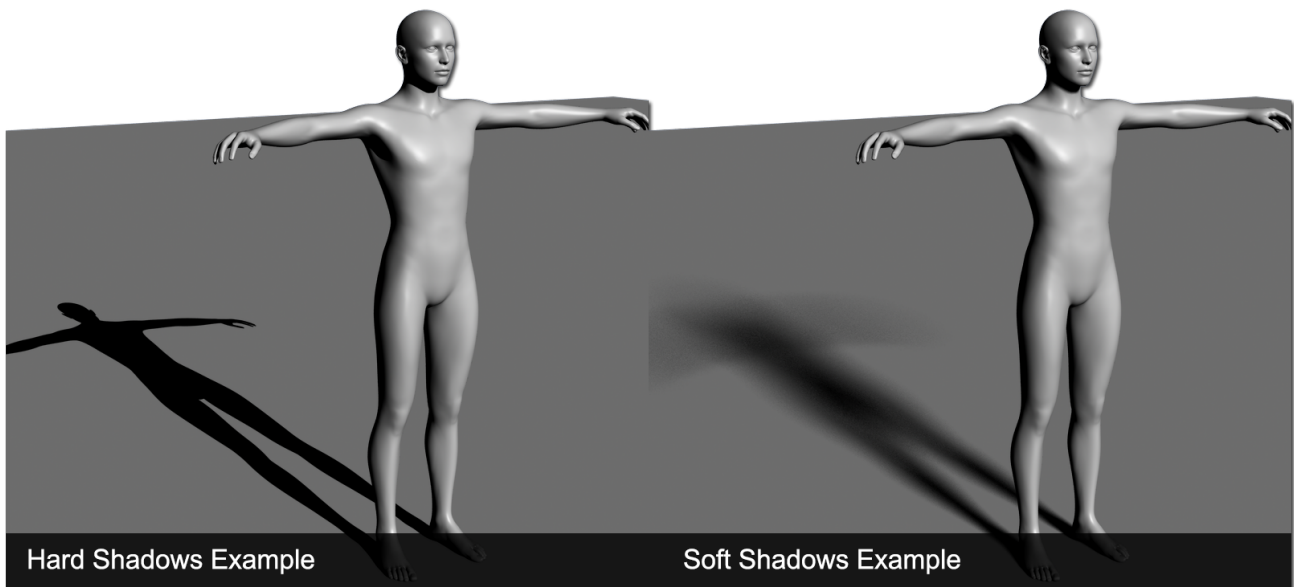
Illumination

The illumination property is located in the Light Group. By default Illumination is set to on. By clicking on the menu you can also choose Diffuse Only, Specular Only, or Off. When the light is set to Diffuse Only the diffuse channel of the surfaces is affected by the light and nothing else. The same is true for Specular Only, except that it is the specular channel that is affected. You can review the definitions of specular and diffuse in Chapter 3.
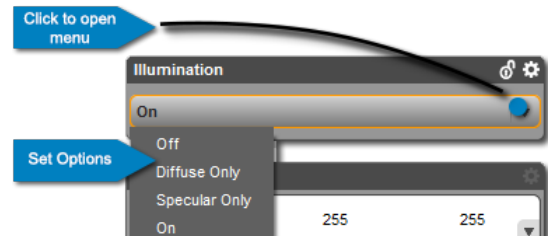
You also have the option to turn illumination off. This turns the light off, and it no longer illuminates the scene. You can also turn off the illumination in the Scene Pane by clicking the eye to the left of the light so that it closes.

Color

The Color Property is part of the Light property group. This property simply affects the color of light. You can get some really great effects by changing the color of the light. Cool renders may benefit from a blue or green light while warm renders can use yellow, red or orange.
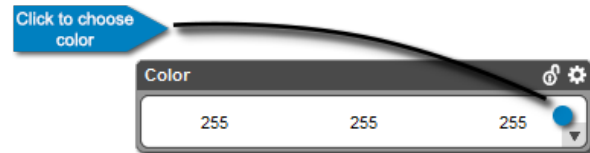
To manipulate color you can click the color in the property. This will launch the Select Color dialog and you can pick a color. If you hover your mouse over any of the RGB values the cursor will change to a double arrow. If you click and drag left or right you can change the value for that color.

Intensity

Intensity determines how bright the light is. We'll get into what intensity values are best for each light later on in this chapter. You can adjust intensity by using the slider. Click on the slider and move it left or right to decrease or increase the intensity value. You can also enter a numeric value by clicking the value for the property and entering a number into the numeric value field.

Spread Angle (Spotlight Only)

The properties listed above are common to all lights. Spread Angle is a property unique to spotlights. It determines how wide the light spreads out from the source. Increasing the spread angle will increase the area illuminated by the light. Decreasing spread angle will focus the light into a narrow area. You can manipulate this property using the slider, or by entering a value into the numeric value field.
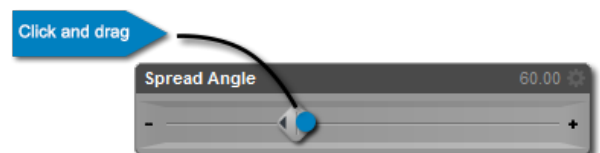
Falloff Start/End (Linear Point Light Only)

Falloff Start and Falloff End are actually two sepa-
rate properties but the work together and function simi-
larly. These two properties are unique to the linear point
light. When you load a linear point light into the scene
you will see two spheres. Falloff Start is represented by
the inner sphere and Falloff End represents the outer
sphere.

Anything within the Falloff Start sphere will be illuminated at the full value of the light. As light
leaves the inner sphere it begins to falloff and the intensity of the light decreases. Once light reaches
the Falloff End sphere the intensity is 0. Anything outside of the Falloff End sphere will not be illumi-
nated.

Both properties can be manipulated using their individual sliders. You can enter numeric
values for both properties using their respective numeric value fields. For more information on these
two properties, and many other shadow and light properties please see this video: Lights Editor.

7.4.2 – The Lights Pane Presets Page

The Presets Page of the Lights Pane is where you can load Light(s) Presets. A light preset
will load a light, or set of lights into the scene. Light presets may be designed for a specific scene, or
for general use. Either way, a light preset is a great way to get high quality lighting in your scene.
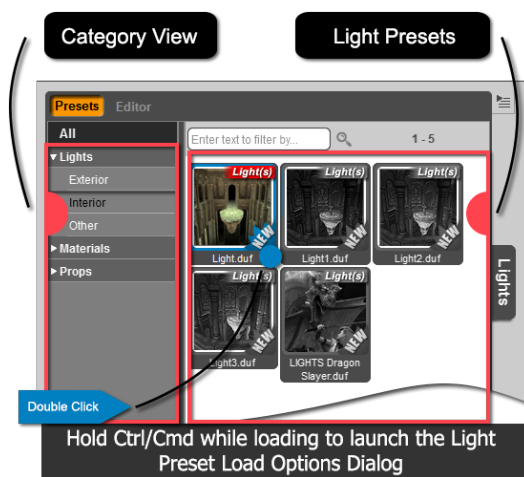
The Presets Page of the Lights Pane is separated into
two columns. On the left hand side are categories, and
on the right are files in the selected category. The page
functions just like the Smart Content Pane.

To load a preset, choose a category in the left hand
column. Once that category is chosen you can pick from
the presets available in the right column. Double click the
preset icon or drag and drop the icon to load it into the
scene.
Note: You can also load Light Presets from the Smart
Content Pane and the Content Library Pane.

When you load a light preset it will replace all existing
lights in your scene so be careful. If you'd like a light preset to
add to your scene lights rather than replace them hold down
the Ctrl key on the PC or Cmd key on the Mac while loading
the preset. This will launch the Light Preset Load Options dia-
log. In the action menu for this dialog you can choose wheth-
er or to replace all of the lights, only the selected lights, or to
simply add the lights from the preset to your scene without
replacing existing lights.
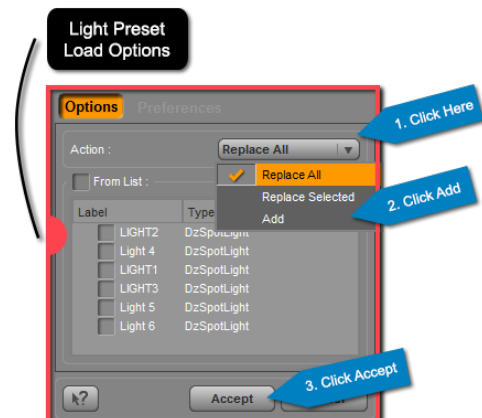
DAZ Studio comes with several light presets for the Alchemy Chasm scene. There are other light presets that have a more general use. If you'd like more light presets you can purchase more from the DAZ 3D Store. You can learn more about Light Presets by watching this vide: Light Presets.

Section 7.5 – Viewing Through a Light

You can manipulate a lights position and rotation in the Lights Pane, or directly in the viewport using the Universal Tool. These are great, especially for the Point Light and Linear Point Light. DAZ Studio also provides the option to make distant lights and spotlights your active viewport view. When you view through a distant light or spotlight you can manipulate it using the Camera Control Tools.

To view through a light first make sure that you have either a spot-light or a distant light (it won't work with a point light or linear point light). Open the view selection menu. Below the cameras (if you have any in your scene). You will see all of the distant lights and spotlights in your scene. Select one of them to make it your active viewport view.

When viewing through a light there is no perspective, just like the orthographic views. However, you can use the orbit, pan and frame tools as well as the camera cube to move your light. This allows you to aim your light with precision. You can see through the perspective of the light exactly what is being illuminated. It allows you to make the subtle but important changes to your lighting, that otherwise would be very difficult.
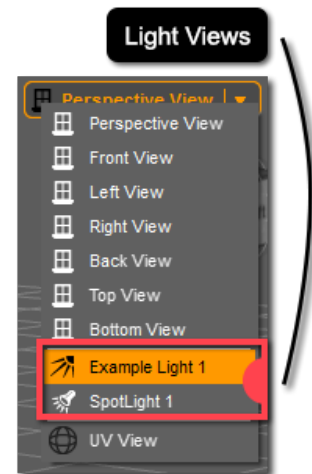
Section 7.6 – The 3 Point Rig

While it is beyond the scope of this user guide to get into the nuances of complex lighting it is important to give you a good place to start. The 3 Point Lighting Rig is a common lighting setup found in both the 3D world, and the real world. The setup consists of 3 lights illuminating a subject. The lighting is designed to highlight a single subject for a portrait.

The setup is simple enough – three lights each placed at a different angle to the figure. The three lights are called the key light, the fill light and the rim light. In DAZ Studio you can use either spot lights or distant lights for the key, fill and rim lights. Distant lights are simpler, but spot lights can give you more control over shadows and illumination. We'll discuss the purpose, placement, and relative intensity for each light below.
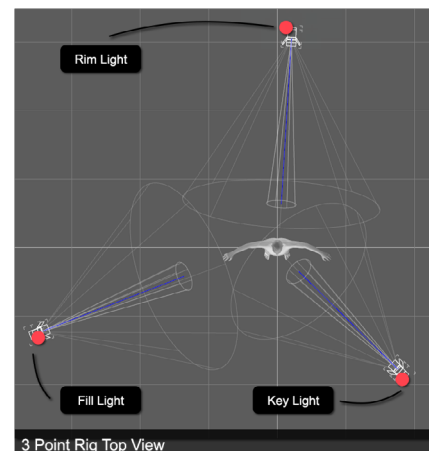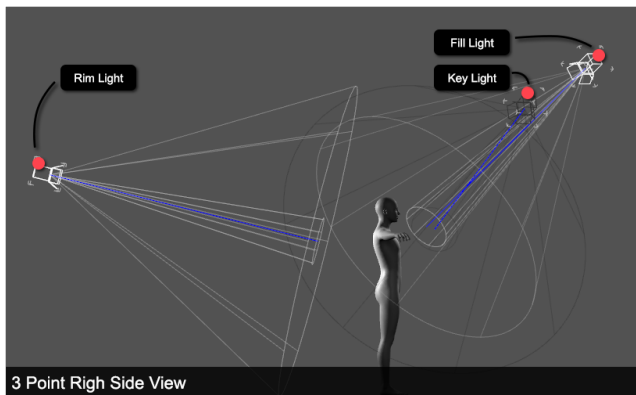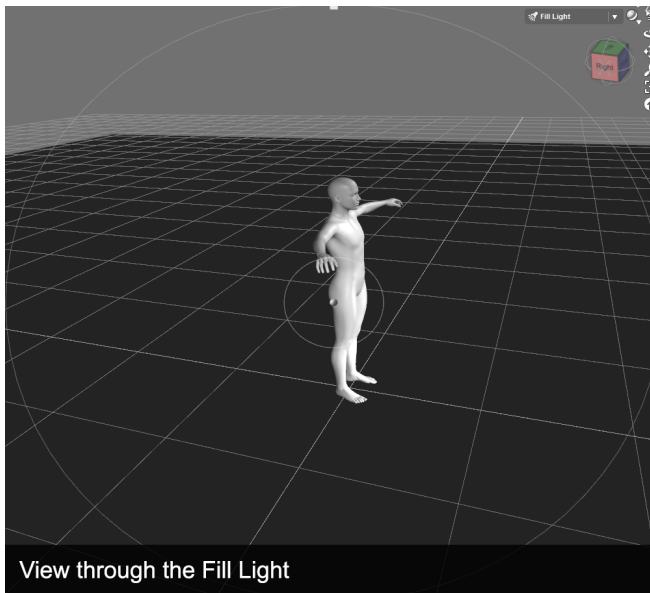
7.6.1 – The Key Light

The key light is the main light in the scene. Its job is to illuminate the face and front of your subject. The key light should be placed in front of and pointed at the subject. You have a bit of leeway when placing the key light. Most people prefer to have the key light slightly offset, rather than directly on the subject. A generally acceptable range is 45° to the left or right of the subject's midline. This gives you a 90° range to place the light. In the real world we are used to light coming from above. You can set your key light to light from below, or at the level of the subject. However, most three point light rigs have the lights positioned above the subject and pointing down.

View through the Key Light
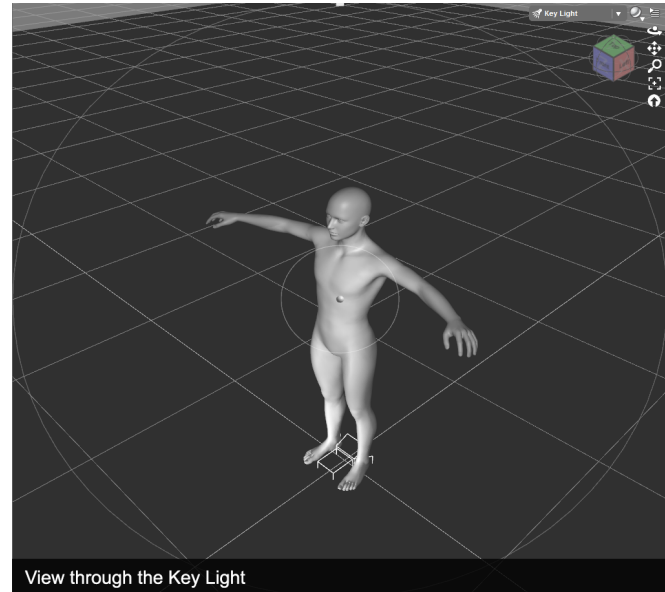
Since the purpose of the light is to light the front of the model the light intensity should be set so that the subject is visible, but not washed out. A good starting point for most light rigs is 100%. If the subject is washed out turn the intensity down. The intensity value is something you'll need to play around with. Remember there will be 3 lights in the scene, and they will all interact, so make sure you have all the lights in the scene before you decide on an intensity value.

7.6.2 – The Fill Light

View through the Fill Light

The job of the fill light is to fill in dark spaces left by the key light. This means the fill light is also placed in front of the subject. The fill light should be offset from the key light by about 90°. This means that if your key light is 15° to the left of your subject the fill light would be around 75° to the right of the figure. This is just a general guideline; the purpose of the fill light is to fill in dark spots on the front and sides of the figure. Keep this in mind when placing your fill light.

The fill light shouldn't be very intense. You want the fill light to fill in the blanks left by the key light, not overpower the key light. Try starting the intensity of the fill light at around 40% and work your way down from there if it is too bright.

7.6.3 – The Rim Light

The rim light provides light from behind the subject. When set up properly the light from the rim light will catch the edges of the subject and highlight them. The rim light fills out and illuminates the rest of the scene. The rim light will be pointed in the general direction of the camera causing the rest of the scene to look brighter.


View through the Rim Light

Just like the other lights, there are no hard and fast rules that determine placement, just guidelines. The goal is to have the light rig illuminate the subject and make him or her stand out; it is important to keep this goal in mind when placing the rim light. In general the rim light should be behind the subject. You will want to offset the rim light so that it doesn't combine with the key light and wash out the subject. In general the rim light should be offset towards the fill light.

Since the rim light is lighting the back of the subject the intensity on this light will be the brightest of all the lights in the scene. DAZ Studio allows you to overdrive lights (set the intensity above 100%). A good starting intensity value for the rim light would be around 120%, you can go up or down from there depending on your needs.

7.6.4 – Spot Rendering Your Lights

Each of the lights in your scene will interact with other lights in your scene, and the surface of your figure in a way that can't be displayed properly in the preview. In order to see exactly how your light look you will need to render the scene. We've covered spot rendering in Chapter 3 and the process is no different now.


Tool Bar
Click Here

Spot Render Example
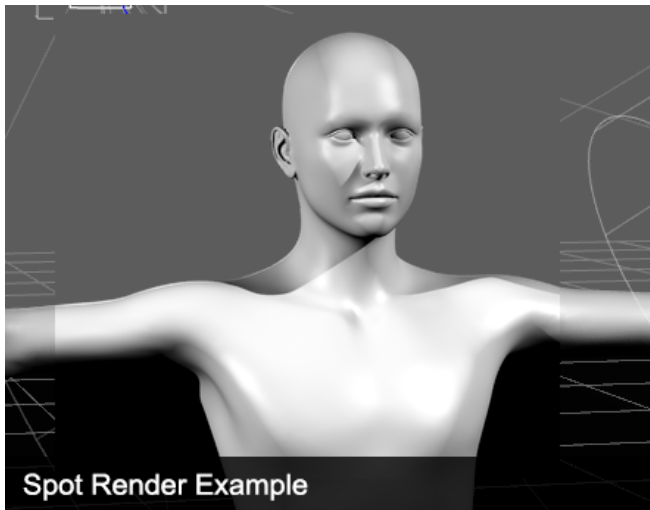
To start a spot render first activate the spot render tool in the tool bar. Once the spot render tool is active click and drag across the area you wish to spot render. DAZ Studio will render that area in the view port with your current render settings.

Use the spot render tool as well as the preview in the viewport to set up your lights. Remember each light interacts with the others; changes to position, intensity and color will affect how the other lights in the scene appear.

Section 7.7 – Saving a Light(s) Preset

So you've set up your three point lighting rig, or another light set up and you are in love. You know that this light set will look great in other scenes. DAZ Studio allows you to preserve all your hard lighting work with a Light(s) Preset. A Light(s) Preset will save information about position, color, intensity, etc. for the lights in your scene.

To save a Light(s) Presets make sure you have the light you want to save the preset for selected in the Scene Pane. If you want the preset to save for all lights your scene selection is irrelevant. Once your selection is made go to File → Save As → Light(s) Preset... This will launch the Filtered Save dialog. In the Filtered Save dialog you can name your preset and choose a save location. Once you are ready click "Save." Make sure you take note of where you are saving your preset to so you can find it later.
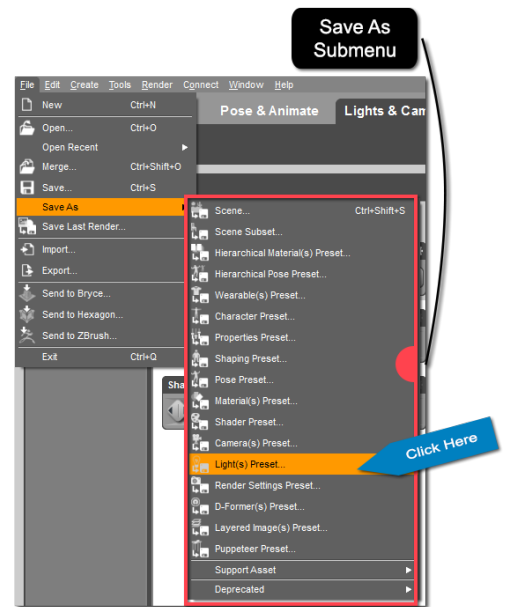
Once you click "Save" the Light(s) Preset Save Options Dialog will launch. This dialog is broken into three parts – Animation Range, Light Data and File Options. Animation Range allows you to choose whether the preset applies for the current frame only, or over an animation range specified by the Start Frame and End Frame. Light Data allows you to choose whether the preset is for the selected light, or for all lights in the scene. Finally, File Options allows you to choose whether or not to compress the file. Once you have your preset options set click "Accept" and DAZ Studio will save the Light Preset.

You will be able to load the Light Preset from the Presets Page of the Lights Pane. Open the Presets Page and look under the "Uncategorized" category. You can double click the icon for your preset, or drag and drop it into the scene to load it.
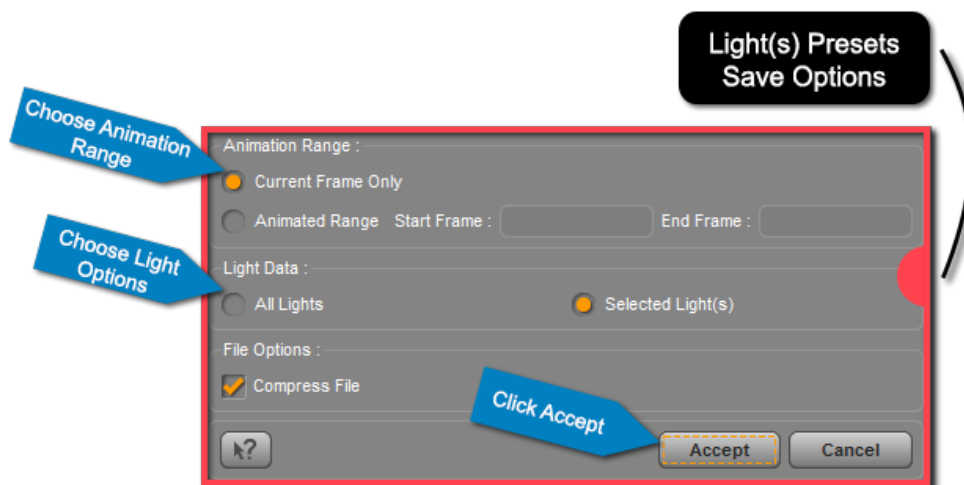
7.8 – Wrap-Up

Congratulations on making it through this chapter on lighting. You should now be able to load a distant light, spotlight, point light and linear point light into your scene. You should be able to manipulate the properties for each light to properly light your scene.

Good lighting takes practice and patience, just like everything else with 3D. There is no magic "Make Art" button that will do the work for you. Hopefully though, you'll find the process of lighting your scene rewarding. Each artist is unique; you can use lighting to distinguish yourself from those around you.

Final render using 3 Point Lighting and a ground plane to product shadows