Camera lens terms and theory

This section gives the user a working vocabulary of the terms regarding lenses in the real world and as related to the parameter items in Studio 3.

**Perspective view:** A toggle that turns the camera from a perspective view to orthogonal view. Perspective is the ‘normal’ view that shows the respective size of objects over distance. Though items may be the same physical size, an item closer to the viewer appears larger than the same sized object located further away from the viewer.

**Orthogonal view:** Items in the scene are the same size regardless of distance from the viewer. The orthogonal view helps place objects in the virtual 3D space and is best used with the other view ports and cameras (such as the top and right view point cameras).

**Focal length:** The distance from the center of the lens to the focal point is the focal length of the lens. This means a 50mm lens (considered a normal lens for 35mm film cameras) is 50 mm long. A 200 mm lens is (you guessed it) 200 mm long. Mirrors, refraction properties of glass and modern technology change the real length of some lens, but this is the background to help understand how a lens is measured. In Studio 3, the default focal length is 65mm.

**Focal Distance:** The distance from an object or point you are focusing on through the lens to the film plane of a camera (or focal point). When you set a photographic lens' focus ring to infinity, the place behind the lens (inside the camera) where light rays converge to a point is the focal point. In DAZ|Studio, you ‘set’ the distance from camera to subject. In real world terms, this equates to the focal point.

**Depth of Field:** All lenses have a depth of field where the subject and items in front of and behind the subject are all in what is called the ‘range of acceptable focus’. This range of focus (where everything is in focus) falls 1/3 of the distance in front of the subject to 2/3 the distance behind the subject for any given F/Stop. This area is the Depth of Field (DOF). Anything outside of that Depth of Field becomes out of focus and appears fuzzy in photographs (and, we’ll see, in your 3D renders).

**F/Stop:** In the real world, F/Stop is a ratio (which is why it is written with a slash) of the length of a lens over the size of the aperture letting the light through. A lens of 50mm length with an aperture opening of 25 mm is an F/2 setting. If the aperture is smaller, say 10mm, then the F/Stop is 50/10 or F/5. In general, the smaller this ratio, the greater the Depth of Field the lens produces. Most lenses
have a substantial DOF with ‘fractions’ as low as f/32 or f/64 which means the aperture opening is very small (and the DOF is at maximum).

Putting this all together allows photographers and 3D artists to control how much of a scene is in focus.

In the above illustration, the camera is focused on a specific object or point and at a specific distance from the lens at some F/Stop setting. For any F/Stop setting there is an Acceptable Range of Focus. This area is basically the Depth of Field for specific settings used. As shown, a setting of f/22 has a greater depth of field (acceptable range of focus) than a setting of f/18.

When the DOF control is off, all objects in the scene are in perfect focus. However, the human eye focuses on specific points and the items within the peripheral seem out of focus. Using depth of field and lens controls allows you to mimic more realistic images.