Creative Decisions and Control

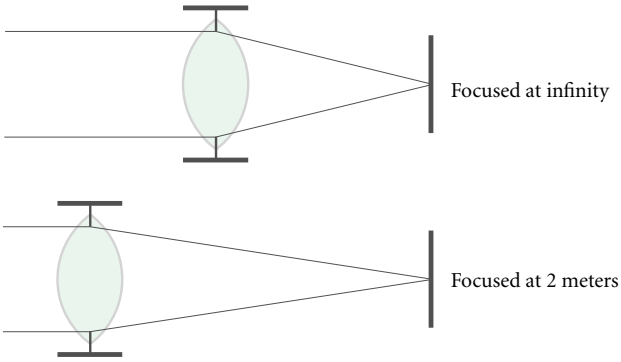
Much of the practice of photography involves the compromise between one set of priorities and another. So without any other criteria to guide your choice between one set of apertures and shutter speeds, these choices are equivalent, allowing the same amount of light to expose your image:

*f*5.6 @ 1/125s *f*8 @ 1/60s *f*11 @ 1/30s

In practice though, there are several reasons why one of these choices may be better than the others for the particular image you have in mind. When you start to juggle priorities, one of the first may be a consideration for depth of field.

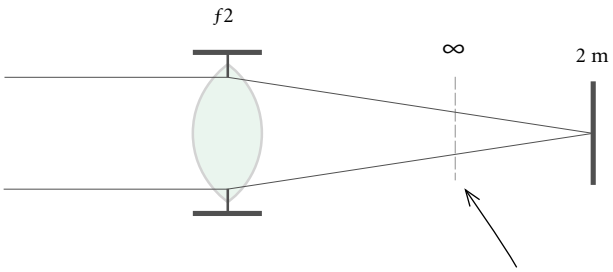
Depth of Field / Depth of Focus

First, notice what happens when you change the focus of your lens. When the focus is set for infinity (∞) it is as close to the film plan as it will go. Move the focus closer and the lens extends away from the camera body and film plane. Focus on a lens changes by changing the distance to the film plane. An image is focused when the light coming from each subject point is bent as it passes through the lens so that all light from that point meets at a single point on the film plane. At infinity the focal distance is the focal length of the lens. By the time the lens extends twice the focal length it is focused at a subject that is also 2x the focal length.

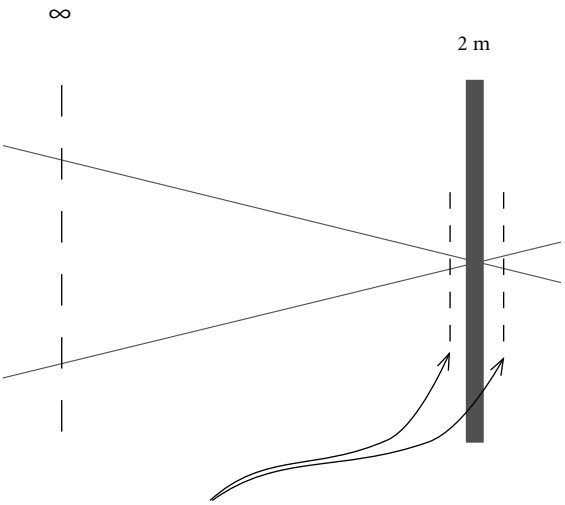


Depth of field is the area of sharp focus in front and behind the actual subject area that you are focusing on. The first thing to keep in mind about it is that the actual measurement of depth of field is a mathematical invention that describes a range of an image that is "good enough" to appear in focus. The area of sharpest focus will still be at the plane where the lens is focused—the subject does not suddenly go from in-focus to out-of-focus all at once. As different parts of an image that are farther and farther away from the plane of best focus the image of each point in the subject is focused less and less until at some point its diameter exceeds the limit you set for it. This limit, in optical formulas, is know as the *circle of confusion* and is defined as the allowable diameter for a point source of light as it begins to blur.

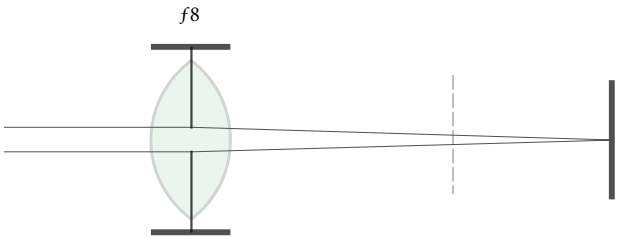
Depth of field is controlled by the aperture of your lens as you make your exposure. Although the absolute measurement of depth of field depends on the size that you use to define your allowable circle of confusion, the relative depth of field depends can be seen as a function of basic geometry, which we can illustrate like this:



1. If a lens is focused on a subject at 2 meters, the subject matter that is at infinity is being described by points that are very large—overlapping, or visually, blurring.



2. (#1 enlarged) Points in subject matter close to 2 meters is described by much smaller circles. Somewhere near the plane of sharpest focus the circles will be small enough that the image will still appear to be in focus.



3. Stopping down a lens 2 stops reduces the aperture's diameter by 1/2, so the resulting circles of confusion are also half their original diameter at any point along their focus. Stop down another 2 stops and you get another decrease in circle size and increase in apparent focus in subject matter that is away from the plane of best focus. This is a *quadrupling* of the depth of field.

*f*4 *f*22

4. Depth of field is neither a good thing nor a bad thing. It is simply an optical property that you can put to use for your particular needs if you know how to control it. If your goal is to simplify a background and isolate a subject, you have additional criteria for deciding which aperture/shutter speed combination to use.