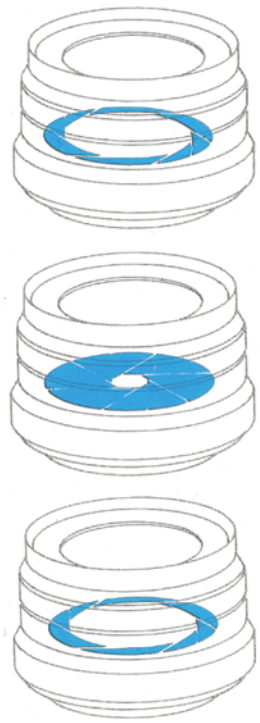
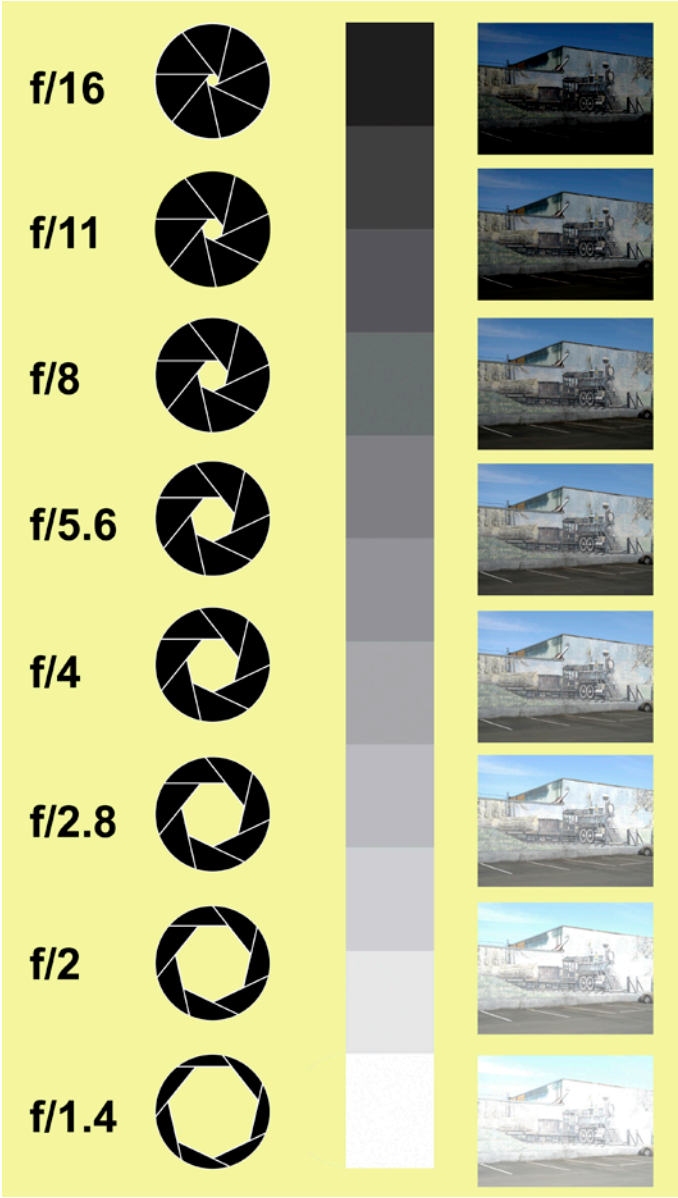
The Aperture Controls Light and Depth of Field



In better cameras, the aperture is a series of overlapping leaves located between the glass elements in the lens.

The size of the aperture can be adjusted to control the brightness of the light reaching the image sensor. The aperture can be opened up to let in more light or closed (stopped down) to let in less. In respect to just exposure, smaller apertures let less light strike the image sensor so the image is darker. Larger apertures let in more light so the image is lighter.



As the aperture number gets smaller (for example, from f/16 to f/11) the aperture opening gets larger and the image gets lighter. The reason you don't usually see this effect in your images is because in most exposure modes when you or the camera change the aperture, the camera changes the shutter speed to keep the exposure constant.

As with the shutter speed, the aperture also affects the sharpness of your picture, but in a different way. Changing the aperture changes the *depth of field*, the depth in a scene from foreground to background that will be sharp in a photograph. Smaller apertures increase depth of field while larger ones decrease it. For some pictures—for example, a landscape—you may want a smaller aperture for maximum depth of field so that everything from near foreground to distant background is sharp. But perhaps in a portrait you will want a larger aperture to decrease the depth of field so that your subject is sharp but the background is soft and out of focus.

Animation

Click here to explore the standard series of apertures and the aperture's effects on exposure.

A small aperture increases depth of field so foreground and background are sharp (top) and a large aperture decreases depth of field so the background is soft (bottom).

Animation

Click here to explore how the aperture affects depth of field.

TIP

Depending on the available light, you may have access to only some of the camera's apertures. To access smaller apertures, increase the ISO. To access larger apertures, use a neutral density

Apertures

f/1.4	f/1.6	f/1.7
	f/1.8	
f/2.0	f/2.2	f/2.5
	f/2.6	
f/2.8	f/3.2	f/3.5
	f/3.5	
f/4.0	f/4.5	f/5.0
	f/4.5	
f/5.6	f/6.3	f/7.1
	f/6.7	
f/8.0	f/9.0	f/10
	f/9.5	
f/11	f/13	f/14
	f/13	
f/16	f/18	f/20
	f/19	
f/22		

Aperture settings are called *f/stops* and indicate the size of the aperture opening. Each f/stop lets in half as much light as the next larger opening and twice as much light as the next smaller opening. From the largest possible opening to increasingly smaller ones, f/stops have traditionally included those shown in the first column in the table to the left with the largest at the top. No lens has the full range of settings; for example, the standard lens on a digital camera will range from about f/2 to f/16. Note that as the f/stop number gets larger (f/8 to f/11, for example), the aperture size gets smaller. This may be easier to remember if you think of the f-number as a fraction: 1/11 is less than 1/8, just as the size of the f/11 lens opening is smaller that the size of the f/8 opening. Many high-end digital cameras have added one or two settings between each of the traditional ones. In the table to the left one-third and one-half stops are shown in the second and third columns.

How wide you can open the aperture depends on the len's *maximum aperture*—its widest opening. The term "fast lens" usually applies to lenses that can be opened to a wide maximum aperture. For example, a lens with a maximum aperture of f/1.8 opens wider, and is faster, than a lens with a maximum aperture of f/2.6. Faster lenses are better when photographing in dim light or photographing fast moving subjects. With most, but not all, zoom lenses the maximum aperture changes as you zoom the lens. It will be larger when zoomed out to a wide angle, and smaller when zoomed in to enlarge a subject.