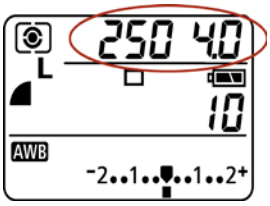
Using Shutter Speed and Aperture Together



Many cameras display the current aperture and shutter speed settings on the monitor, in the viewfinder, or on a separate LCD panel when you press the shutter button halfway down.

As you've just seen aperture and shutter speed settings are arranged so that a change of 1 stop in either lets in half or twice the light of the next setting. This relationship means a change in one setting can be offset by a change in the other. This is exactly what happens in aperture and shutter priority modes where a change in one setting is offset by a change in the other. If you make the shutter speed 1 stop slower (letting in 1 stop more light), and the camera automatically selects an aperture 1 full stop smaller (letting in 1 stop less light), the exposure doesn't change. However, the pictures may differ. These changes increase the depth of field and the possibility of blur from camera or subject movement. Lets look at two analogies.

Exposure—faucets & buckets analogy

One way to think of the relationship between apertures and shutter speeds is to use the analogy of a faucet for the aperture and a timer for the shutter speed.

• When you open a faucet all the way, water gushes out so you fill a bucket in a very short time. This is the same as pairing a large aperture with a fast shutter speed to let in bright light for a short time.

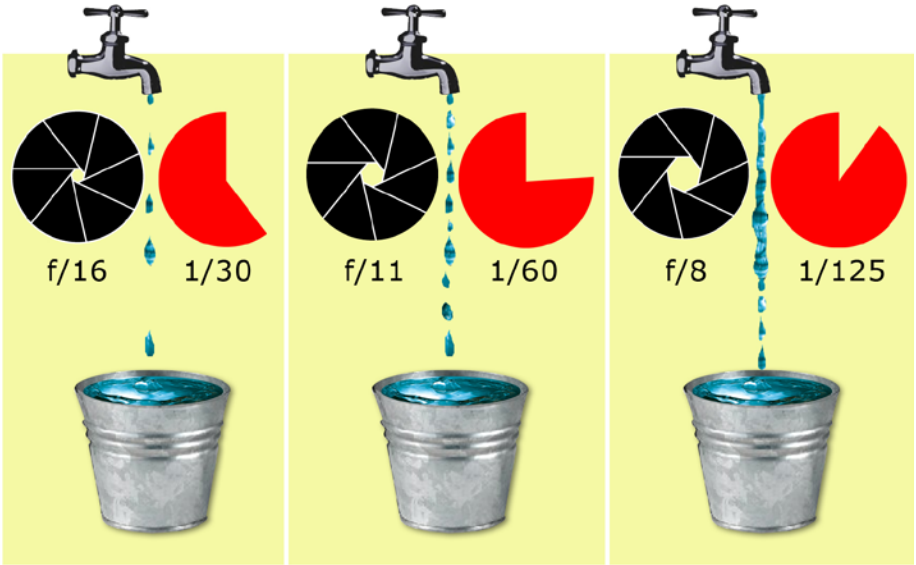
• When you open a faucet just a little, water trickles out and so it takes a much longer time to fill a bucket. This is the same as pairing a small aperture with a slow shutter speed to let in dim light for a longer time.

No matter which combination you choose, the bucket is filled the same amount. Likewise, an image in a camera can be exposed the same amount by various aperture and shutter speed combinations while using their side effects to also control motion and depth of field.

TIPS

• To be sure you are always using the fastest possible shutter speed, set the camera to aperture-priority mode and select the aperture needed for depth of field. The camera will then always select the fastest possible shutter speed.

• To be sure you are always using the largest possible aperture, set the camera to shutter-priority mode and pick the shutter speed you need to freeze or blur motion. The camera will then always select the largest possible aperture.



1. Lets assume you start with the aperture set to f/16 and the shutter speed to 1/30.

2. When you open the aperture one stop to f/11 the shutter speed has to decrease to 1/60 to keep the exposure the same. This change decreases depth of field slightly and freezes action better.

3. When you open the aperture another stop to f/8 the shutter speed has to decrease another stop to 1/125. This change decreases depth of field even more and freezes action even better.

Animation

Click to explore the relationship between the aperture and shutter speed.

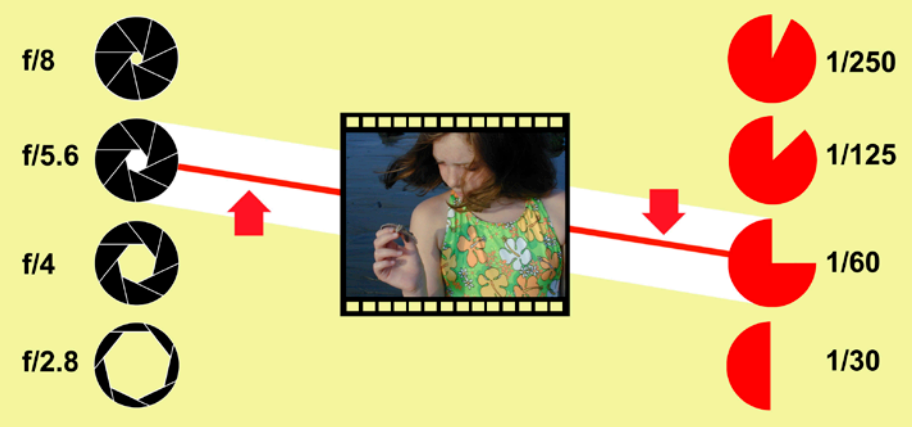
EXPOSURE—SEESAW ANALOGY

Another way to think of exposure is as a seesaw. As one child rises a given distance, the other descends by the same amount, but their average distance from the ground remains the same. In photography, when you or the camera change the aperture or shutter speed to let in more or less light, you or the camera must also change the other setting in the opposite direction to keep the exposure constant.

The illustrations below show how a change in the aperture setting must be matched by a change in the shutter speed and vice versa. As these offsetting changes are made, the exposure stays constant but depth of field changes slightly and subjects are more or less likely to be blurred.

1. Here the aperture is f/4 and the shutter speed is 1/125.

2. If you reduce the aperture one stop to f/5.6 the shutter speed has to decrease one stop to 1/60 to keep the exposure the same.



3. If you reduce the aperture one more stop to f/8 the shutter speed has to decrease one more stop to 1/30 to keep the exposure the same.