

How do Aperture and Shutter Speed Relate?

In the last two tutorials, we looked at aperture and shutter speed and how they affect the look of your photographs. In this tutorial we're going to have a look at the relationship between aperture and shutter speed and how changing one affects the other.

Let's use a bucket of water as a way of illustrating this. Say we fill the bucket with water and then make a small hole in the bottom and let the water pour out into a basin underneath. Because the hole is quite small, the water will be slow to fill up the basin.

Let's try again, this time with a larger hole in the bucket. Now, the water will pour out of the bucket much faster and also fill up the basin below much faster.



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So, what on earth does this have to do with aperture and shutter speed?

Think of the water as the light and the basin as the digital sensor. The hole we make in the bucket is the aperture.

- With a small hole in the bucket, the water takes a relatively long time to fill up the basin.
- With a larger hole in the bucket, the water takes a relatively short time to fill up the basin.

The same principal applies to photographic exposure.

- A narrow aperture in the lens means the light needed to make the exposure takes a relatively long time to enter the lens and reach the sensor. This results in a slower shutter speed.
- A wide aperture in the lens means the light needed to make the exposure takes a relatively short time to enter the lens and reach the sensor. This results in a faster shutter speed.

In a nutshell, we have learnt that generally speaking:

- Narrow apertures will result in slower shutter speeds and wide apertures will result in faster shutter speeds.
- We have also learnt that I have ruined two perfectly good buckets and should probably go and buy new ones before my wife finds out.

Let's take a look at this in practice. I took the following series of photographs in a little park near my home.

You will see that in each photograph, I have used a different combination of aperture and shutter speed. Despite this, the exposure/brightness in each one is roughly the same.

Take note of what happens to the shutter speed each time the aperture changes in the series. I started with a narrow aperture of f22 and finished with a wide aperture of f4.



f22 | 1/40 sec



f14 | 1/125 sec



f8 | 1/320 sec



f4 | 1/1600 sec

You will see that setting narrow aperture of **f22** in the first photo resulted in a shutter speed of **1/40 second**.

In the second photo, I set a wider aperture of **f14**. With a wider aperture now set, the shutter speed is now a much faster **1/125 second**.

At **f8**, the shutter speed is faster again at **1/320 second**.

Finally, with a wide aperture of **f4**, the exposure time is now a very fast **1/1,600 second**.

This tells us that different combinations of aperture and shutter speed can result in the same basic exposure/brightness. In certain photos however, there would be noticeable differences in terms of depth and field and motion blur.

We also learnt that my wife will kill me if she finds out what I've done to those two buckets. I'd better go to the bucket shop ASAP.