



HOW DO SHUTTER SPEED AND APERTURE DETERMINE CORRECT EXPOSURE?

EXPOSED!

YOU HAVE JUST TAKEN THE PHOTO OF A LIFETIME —

capturing the interception that led to the winning touchdown that resulted in a victory that put your team into the playoffs. You pointed the lens on the right player, snapped the shutter at just the right moment and now all you have to do is download the photograph, enlarge it and wait for the praise to pour in.

EXCEPT. When you display the photograph on the computer screen, the ball is blurry. And so is the player; in fact, so are all the players. It looked so perfect through the viewfinder. How did this happen?

Bad photos happen when photographers do not completely grasp how their camera uses light. Learning the rules of composition is the easy part. Learning how to make sure the photograph is correctly exposed makes the difference between the dominant photo on the page and another picture in the trash.

Because most cameras (whether digital or film) have an automatic setting, amateur photographers do not realize how important it is to know about exposure. They may not realize the camera translates every image into 18 percent gray (about the color of grass) to come up with the average correct exposure. In addition, that camera has no way of knowing that you needed all FOUR rows of the group shot to be in focus. Or that you wanted the soccer ball sharp and clear in that corner kick photo.

The good news is that controlling for these situations is a snap (pun intended), if you understand how exposure works.

Let's start with the basics. And because this is a basic lesson, assume that the ISO (the third variable in exposure) is set at 400 for all of these examples.

EXPOSURE

Exposure is achieving the correct amount of light. Exposure is achieved by adjusting aperture (which is used for depth of field) and shutter speed (which is used to blur or freeze motion) to achieve the desired results.

Both aperture and shutter speed combine to determine correct exposure. If you change one, you must change the other to end up with the same amount of light hitting the camera's image sensor.



SHUTTER SPEED

Shutter speed is how long the shutter stays open. To capture still photos of fast motion (Example 1), you have to use a fast shutter speed.

Example 1: f-6.3 1/800



If the subject of your photo is not moving, or you want to blur action (Example 2), then you can use a slower shutter speed.

Example 2: f-5.6 1/10

The shutter speed determines the amount of time that the lens opening stays open. It is measured in seconds and fractions of seconds. A very fast shutter speed would be 1/2000 or 1/1500 of a second; you can also slow the shutter speed down to 1/60 or 1/30 or slower.

If you are hand-holding a camera, keep this tip in mind: the shutter speed should never be slower than the focal length of the lens being used. In layman's terms, this means that if you are using a standard 50-mm lens, the slowest hand-held shutter speed should be 1/60 of a second. Any slower speed will probably result in an out of focus photo because of camera jiggle. If you are using a zoom lens, use a shutter speed closest to the largest number on the lens. An 80-200-mm lens requires a shutter speed of at least 1/250 of a second, the closest speed to 200-mm.



If a flash is used, it typically captures action at 1/1000 of a second, so blurring is not so great a problem. Please keep in mind that the light from the flash can only travel a relatively small distance before losing its "power," so it is not a solution to action that is far away.

APERTURE AND DEPTH OF FIELD

Aperture is how wide the lens is open. Every time you take a photograph, the lens of your camera opens to let in light. The aperture setting determines how much or how little your lens opens when you take a photograph. It's important to remember the smaller the number, the larger the opening will be.



When your lens is open very wide, f-2.8 or f-4, the background is typically out of focus (Example 3). A wide-open aperture is good when you don't want the background to interfere with or detract from your subject.

Example 3: f-2.8 1/320



When your lens is only open a small amount, f-11 or f-16, everything from the foreground to the background is in focus. This aperture is used for group shots and other times you may want almost everything in the photo to be in focus. (Example 4)

Example 4: f-11 1/500



IT'S YOUR CHOICE

Now that you understand these two variables and that they **MUST** work together, you can choose what is most important in any given situation. To stop action, you will need a fast shutter speed. In order to let enough light in, that fast shutter speed requires a wide-open aperture. So set your camera to Shutter Priority and no slower than 1/500 of a second and focus carefully on your subject.

On the other extreme, if you are taking a group photo of 40 DECA students, you don't care if the shutter speed is fast. You **DO** care that all rows are in focus. In this case, you will go to Aperture Priority, set the f-stop at either f-8 or f-11 or f-16 (if possible) and focus on the middle row. Your shutter speed will slow down to allow time for enough light to enter the camera. And everyone should be in focus.

The best way for all of this to make sense is to experiment with your camera **BEFORE** that important football game or school dance. Set your camera to Shutter Priority and shoot fast moving subjects using different shutter speeds. Cars make great subjects for this experiment. Now set your camera to Aperture Priority. Set the lens wide open (f-2.8, for example) and, without moving, focus on and shoot something in the foreground, the middle and the background. Do the same with the lens set at f-11. Look at all the photographs to analyze shutter speed and focus.

Once you master these two functions, you can shoot with confidence, knowing that your next photograph will look as good in print as it did through your viewfinder.

In the results table, each setting provides the **SAME** amount of light to the camera. But the results will be completely different.



RESULT	F-STOP	SHUTTER SPEED
Stop action of runner	f-2.8	1/1000
Marching band practice	f-5.6	1/250
Classroom discussion	f-8	1/125
Group photo	f-11	1/60

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