



Exposure Basics: Correctly Expose Your Photographs

by Bryan F Peterson

Every [picture](#) taking opportunity allows you to record no less than six correct exposures!

Perhaps you have already figured it out after reading the above, but if not, you will soon know that most picture taking situations have at least six possible combinations of f/stops and shutter speeds that will all result in a correct exposure; not a creatively correct exposure but a correct exposure. But only one, sometimes two, of these combinations of f/stops and shutter speeds is the creatively correct motion-filled exposure.

Again, let's review, that every 'correct' exposure is nothing more than the quantitative value of an aperture and shutter speed working together within the 'confines' of a predetermined 'ISO'. For the sake of argument we are both out photographing a city skyline at dusk, using a film speed of 100 ISO and an aperture opening of f/5.6 and whether we are shooting in manual mode or aperture priority mode the light meter indicates a correct exposure at 1 second. What other combinations of aperture openings (f/stops) and shutter speeds can we use and still record a 'correct' exposure? If I suggest we use an aperture of f/8 what would the shutter speed now be? Since we have cut the lens opening in half (f/5.6 to f/8) I will now need to double my shutter speed time to two seconds to record a correct exposure, (1 sec + 1 sec = 2 seconds.) On the other hand, if I suggested that we use an aperture of f/4 what would the shutter speed now be? Since we have just doubled the size of the lens opening (f/5.6 to f/4) I will now need to cut my shutter speed in half (1/2 second) to record the same 'quantitative value exposure'.

Easy yet hard, right?

For a refresher on these terms, take a look at Bryan's intro article on [Basic Photo Tips: Aperture, Shutter Speed, and ISO](#).

The Equations

The following are equivalent:

- f/4 at 1/2 second
- f/5.6 at 1 second
- f/8 at 2 seconds
- f/11 at 4 seconds
- f/16 at 8 seconds
- f/22 at 16 seconds

Add them up and what have you got? Six possible combinations of aperture and shutter speeds that will all result in exactly the same exposure. I want to stress the word 'same'; it is meant to mean the 'same' in terms of quantitative value only!

Likewise, if we find ourselves taking an outdoor portrait at the park with our telephoto zoom, we find that with our aperture set to $f/16$ and with an ISO of 100, a correct exposure is indicated at a shutter speed of a $1/125$ second (s). If I suggest we use an aperture of $f/8$, what would the shutter speed now indicate as a correct exposure? If you said $1/500$ s, you are correct, which also means that you know at $f/22$ the correct exposure would be a $1/60$ s and at $f/11$ $1/250$ s and at $f/5.6$ your shutter speed would now be $1/1000$ s. Again, why all the 'fuss'; what difference does it really make which combinations of apertures and shutter speeds we use as long as the meter indicates a correct exposure?

Knowing that every picture taking opportunity offers you no less than six possible aperture/shutter speed combinations in and of itself may seem immaterial, but when you consider the impact of the creative possibilities influenced by the shutter speed (freezing actions, implying motion or panning) and aperture (a great depth of field, or a background of muted tones and/or out of focus foregrounds) you will have a much greater appreciation for why you are choosing *that* particular shutter speed and aperture combination. The reason will *not be* simply because you want to record a correct exposure, but rather because you want *each* and *every* time to record the CREATIVELY CORRECT EXPOSURE! The difference between a "correct exposure" and a "creatively correct exposure" is often huge! Let's take a look!

Let's pretend we've invited ten other photographers to join us in capturing this scene and we break into three groups:

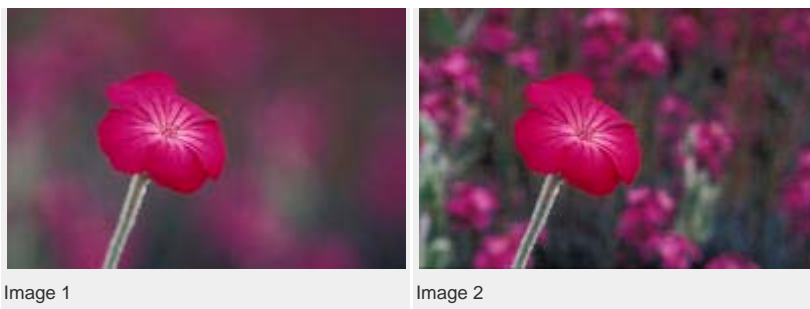
- One third of the group shot this scene at $f/11$ for four seconds
- Another third shot the scene at a $f/8$ for a two seconds
- The remaining third shot the scene at $f/5.6$ for 1 second.

You know what? All of us just shot the exact same **correct exposure**! Even though each group's f /stops and shutter speeds were different, the end result was the same; the quantitative value of each group's exposures are the same. It doesn't matter if you are photographing with a film-based camera or a digital camera, you must learn and embrace a simple fact; every picture taking opportunity offers you no less than six possible aperture/shutter speed combinations. Why must you know this? Even though each group has the 'same' exposure, the motion-filled opportunity that each group captured may look radically different. Knowing that each motion-filled exposure opportunity offers up six possible combinations is a start but knowing which one of two exposures best conveys or capture the motion before is the key. Once you are armed with this knowledge you can begin to fully explore the truly endless road of creatively correct motion-filled exposures!

Now let's imagine that we all awoke the following morning, once again splitting into three groups and we all head into a flower garden. All of us are armed with our telephoto zooms and we are going to record correct exposures of a single flower bloom.

- One third of the group shoots that lone flower at a correct exposure of $f/4$ at $1/1000s$.
- Another third of the group at $f/8$ at $1/250s$.
- The last third of the group shot that same flower at $f/16$ at $1/60s$.

Fifteen minutes later we all get together and compare results and guess what? Every one of us has recorded the 'same' and correct exposure in terms of its quantitative value, *but*, each group also recorded a visually different yet correct exposure. The visual difference is the *key* to understanding the difference between a correct exposure and a creatively correct exposure. Although the quantitative value of each exposure was the same, the aperture choices were different and therein lies the visual difference. Depth of field increases each and every time we stop the lens down and in the case of the flower composition, the smaller apertures recorded a greater depth of field than did the aperture of $f/4$. Again, the exposures taken by all three groups were the same quantitative value but visually they were quite different solely due to the aperture choice.



So to recap: there are six possible aperture and shutter speed combinations that will result in the correct exposure, yet only one, maybe two, is in fact the “creatively correct” exposure. It is that *one* creatively correct exposure that gives you the precise depth of field you were hoping to achieve or that *one* creatively correct exposure that gives the the precise action stopping shutter speed or the precise shutter speed that guarantees a motion-filled image, e.g. the cotton candy effect often seen in waterfall compositions.

Let's take a real world look at just how different a correct exposure is versus that of a “creatively” correct exposure.

Exercise 1: Flower Composition

Head outside with your camera set to 200 ISO and a telephoto lens, say a 200mm, and frame up a flower. Once you focus on the flower, shoot six correct exposures, each one using a different aperture and shutter speed. For example, with the aperture set to $f/4$, you get a correct exposure

indication at 1/1000s. Shoot this one exposure and then move on to f/5.6 and then shoot another at 1/500s, f/8 at 1/250s and another at f/11 at 1/125 second, f/16 at 1/60s and finally another at f/22 at 1/30s. You will soon see that all six exposures are correct in their quantitative value, *but* radically different in their “visual weight”. Note in just these two examples where the first image was shot at f/5.6 at 1/500 second and the second image shot at f/22 at 1/30s. They are the “same” exposure in their quantitative value, but *oh my*, look at how much busier the background is in the correct exposure taken at f/22 versus the much cleaner and more isolated flower composition of the correct exposure taken at f/5.6 at 1/500s.



All three of these images are exactly the same exposure (Images 3, 4, and 5). Their quantitative volume of aperture, (light) and shutter speed (duration of time) is exactly the same, yet you can clearly see that visually they are each different. All three [photographs](#) were taken with my tripod mounted Nikon D2X and 200mm Micro-Nikkor lens.

Image 3 was taken at f/5.6 at a 1/500 second, Image 4 was taken at f/11 at 1/125s and Image 5 was taken at f/22 at 1/30s. Again, their quantitative values are identical, which is to say that the volume of light that passed through the lens and the amount of time that light was allowed to render an image on the CCD or film was the same. When I composed all three of these images, they looked exactly the same inside my camera's viewfinder. Yet when I reviewed these same three exposures on the camera's digital monitor, they were clearly different and that difference in this case was with their backgrounds.

In Image 3, the background is limited to subtle out-of-focus tones, color and very few shapes. In Image 4, the background begins to offer up a bit more information in both shapes and sharper tones and by Image 5, it's 'clear' that the background, consists of other nearby flowers due to the much greater defined shapes and tones that are presented. All three are the same exposure, but as is often the case, only one, and sometimes two, are the “creatively” correct exposure.

Use of Motion

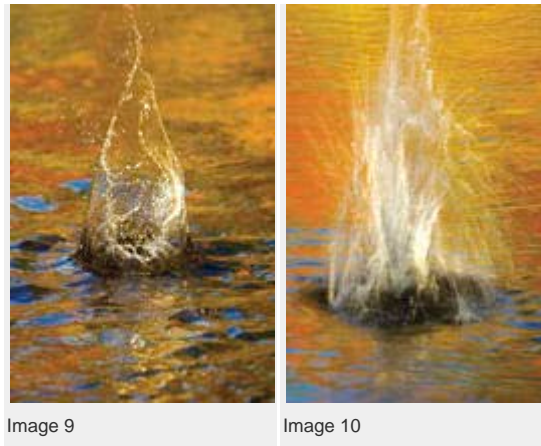
When capturing this simple composition of an S-curve on Interstate 5 approaching downtown Seattle, I was presented with six possible options of recording a correct exposure, three of which you see here (Images 6, 7, and 8). In terms of their 'quantitative value', all three of these images are exactly the same exposure, BUT one can clearly see that they are vastly different in their creative exposure, with the creative emphasis on the use of motion. It has and will always be my goal to present motion-filled opportunities in the most motion-filled way and more often than not when there is a motion filled scene, the longer the exposure time, the greater the motion is conveyed. In our first example, Image 6 was captured at $f/4$ for $1/2s$, Image 7 was shot at $f/8$ for $2s$ and Image 8 was shot at $f/16$ for $8s$. All three of these exposures were made with my Nikon D2X and Nikkor 200-400mm zoom at the focal length of 400mm, mounted on tripod with my ISO set to 100 and my WB set to Cloudy.



An exercise such as this is truly eye-opening. The next time you head out the door to shoot city lights at dusk, there won't be a lot of hesitation on your part about using the slower shutter speeds, since by this example, the slowest shutter speed exposure had the best effect. (I am assuming that you prefer the third image, the image taken at $f/22$ for $8s$ and just so there is no confusion, this is not 'bracketing' since they are all the same exposure in terms of their quantitative value. I will cover bracketing and other issues related to "where should I take my meter reading" in a future article).

Going to Extremes with Shutter Speed

As you begin to digest more and more this simple rule of exposure, it will soon become clear that the need to pay attention to what aperture choice or shutter speed choice will in fact lead you to conclude that there is but **one** truly creatively correct exposure most of the time and this is particularly true as you begin to notice that the world offers up an unlimited supply of motion-filled opportunities. When capturing these motion filled opportunities you will find yourself, more often than not, on either end of the shutter speed spectrum; using fast shutter speeds to freeze the action in crisp sharp detail or using slow shutter speeds and the resulting blur to suggest or imply the motion present. There is rarely a 'middle ground' when it comes to the motion-filled world and with that in mind, it won't be long before you discover that most of your time is being spent on action-filled scenes between $1/500s$ and $1/1000s$ OR between $1/4s$ to $8s$.



With my camera and 80-400mm Nikkor zoom mounted on tripod and the lens set to 300mm, I captured Image 9 at $f/4$ and $1/500s$. Image 10 was shot at $f/22$ and $1/15s$. Both exposures are exactly the same in terms of quantitative value, BUT quite different in the arena of 'creative exposure'. Note how at the wide open aperture of $f/4$ (Image 9) the splash is frozen in crisp sharp detail but at $f/22$ (Image 10) that same splash is much more ethereal.

Recording a correct exposure will always be your responsibility, so why not make it a point to make the most deliberately and visually compelling 'creative' exposure possible!?

Exercise 2: Motion-Filled Exposures

One of the best lessons I know of is one that I have offered up to countless students over the years in my on-location workshops and at my on-line photography school www.ppsop.net. It is a very revealing lesson and not surprisingly will lead you further into the world of creatively correct motion-filled exposures. Choose a moving subject, such as a waterfall or a child on a swing or shoot something as simple as someone pounding a nail into a piece of wood.

With your camera set to Aperture Priority Mode, your ISO set to 100, (or 200 ISO if that is the lowest your camera offers) and your aperture set to wide open, ($f/2.8$, $f/3.5$ or $f/4$) take an image of the action before you. You have just recorded an exposure at the fastest possible shutter speed based on the ISO in use, the light that is falling on your subject and of course your use of the largest lens opening. Now stop the lens down one full stop, (if you started at an aperture of $f/2.8$ then go to $f/4$ and if your lens starts with $f/4$ then go to $f/5.6$) and once again take another exposure of the action filled subject. Repeat this each time with the aperture set next to $f/8$, then $f/11$, then $f/16$ and finally $f/22$. Each time you change the aperture by what is called a 'full stop', your camera does a quick recalculation and offers up the 'new' shutter speed to maintain a correct exposure and since you are stopping the lens down with each full stop change in aperture, (making the hole in the lens half as big as it was before) your shutter speed has now doubled in time to compensate, or in other words, your shutter speed is becoming progressively slower. The slower your shutter speed the more likely it is that your action filled subject before you is showing signs of 'blurring', since the shutter speed is too slow to 'freeze it'.

Conclusion

To re-cap, the fastest possible shutter speed with any given ISO will always be found when you use the largest lens opening and the slowest possible shutter speed (barring the use of any filters) will always be found when you use the smallest lens opening.

There is one thing I hope you will never forget after reading this article: correct exposures can be found just about anywhere, but why settle for just a correct exposure when you can in fact record a truly creatively correct exposure each and every time? You really can take charge of your own creative vision when it comes to exposure!

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