

The Triangle Framing Photographic Philosophy:

A correct exposure is a simple combination of three important factors: **aperture(f), shutter speed, and ISO (triangle)**. Since the beginning of photography, these same three factors have always been at the heart of every exposure, whether that exposure was correct or not, and they still are today—even if you're using a digital camera. I refer to them as the photographic triangle.



Shutter Speed Examples: A half second exposure is ONE STOP darker than a one second exposure. A 1/125 exposure is TWO STOPS brighter than a 1/500 exposure. A 1/1000 exposure is THREE STOPS darker than a 1/125 exposure.

Balancing Shutter and Aperture: Why is the background all blurred in the right picture, and sharpest in the left? Because if the exposure is made with a wide aperture (like f2.8), then objects farther away from the subject are thrown farther out of focus. This effect is referred to as "depth of field" So.. if the aperture is small (like f22) then objects in the background (and foreground) will appear sharper. However, since more light was required to make the exposure on the left (1/4 Second) the subjects became blurred from MOTION. At 1/250th of a second, the shutter is fast enough to freeze motion.

Aperture Setting	Relative Light	Example Shutter Speed
f/22	1X	16 seconds
f/16	2X	8 seconds
f/11	4X	4 seconds
f/8.0	8X	2 seconds
f/5.6	16X	1 second
f/4.0	32X	1/2 second
f/2.8	64X	1/4 second
f/2.0	128X	1/8 second
f/1.4	256X	1/15 second

Shutter Speed	Typical Examples
1 - 30+ seconds	Specialty night and low-light photos on a tripod
2 - 1/2 second	To add a silky look to flowing water Landscape photos on a tripod for enhanced depth of field
1/2 to 1/30 second	To add motion blur to the background of a moving subject Carefully taken hand-held photos with stabilization
1/50 - 1/100 second	Typical hand-held photos without substantial zoom
1/250 - 1/500 second	To freeze everyday sports/action subject movement Hand-held photos with substantial zoom (telephoto lens)
1/1000 - 1/4000 second	To freeze extremely fast, up-close subject motion

Since, Higher f-numbers, slower shutter speed (fast water flow), Lower f-numbers, faster shutter speeds (slow water flow).

ISO

The ISO speed determines how sensitive the **camera is to incoming light** (sharpen). Similar to shutter speed, it also correlates 1:1 with how much the exposure increases or decreases. However, unlike aperture and shutter speed, a lower ISO speed is almost always desirable, since higher ISO speeds dramatically increase image noise. As a result, ISO speed is usually only increased from its minimum value if the desired aperture and shutter speed aren't otherwise obtainable.

ISO and Shutter Speed (Bryan F Peterson)

Since this is such an important part of understanding exposure, I want you to pause in your reading for a moment and get out your camera, as well as a pen and paper. Set the film speed dial to ISO 200; (If you are a film shooter, do this even if you have a roll of film in your film camera that is not ISO 200, but don't forget to set the ISO back to the correct number when we're done here.) Now, set your aperture opening to f/8, and with the camera pointed at something that's well illuminated, adjust your shutter speed until a correct exposure is indicated in the viewfinder. (If you want, you can leave the camera in the automatic aperture-priority mode for this exercise, too). Write down that shutter speed. Then, change your film speed again, this time to ISO 400, leaving the aperture at f/8, and once again point the camera at the same subject. Whether you're in manual mode or auto-aperture-priority mode, you'll see that your light meter is indicating a different shutter speed for a correct exposure. Once again, write down this shutter speed. And finally, change the ISO to 800, and repeat the steps above.

What have you noticed? When you change from ISO 100 to ISO 200 your shutter speed changed: from 1/125s to 1/250s or perhaps something like from 1/160s to 1/320s. These shutter speeds are examples, of course, and not knowing what your subject was, it's difficult at best to determine your actual shutter speeds, but one thing is certain: each shutter speed is close to if not exactly half as much as the one before it.

When you increase the number of worker bees (the ISO) from 100 to 200, you cut the time necessary to get the job done in half. (If only the real world worked like that!) This is what your shutter speed was telling you: Going from 1/125s to 1/250s is half as long an exposure time. When you set the ISO to 400, you went from 1/125s—passing by 1/250s—and ended up at 1/500s. Just as each halving of the shutter speed is called 1 stop, each change from ISO 100 to ISO 200 to ISO 400 is considered a 1-stop increase (an increase of worker bees).

You can do this same exercise just as easily by leaving the shutter speed constant, for instance at 1/125s, and adjusting the aperture until a correct exposure is indicated in the viewfinder; or, if you choose to stay in auto exposure mode, select shutter-priority, set a shutter speed of 1/125s, and the camera will set the correct aperture for you.

Exposure Mode

How It Works

Portrait



Camera tries to pick the lowest f-stop value possible for a given exposure. This ensures the shallowest possible depth of field.

Landscape



Camera tries to pick a high f-stop to ensure a large depth of field. Compact cameras also often set their focus distance to distant objects or infinity.

Sports/Action



Camera tries to achieve as fast a shutter speed as possible for a given exposure — ideally 1/250 seconds or faster. In addition to using a **low f-stop**, the **fast shutter speed** is usually achieved by increasing the ISO speed more than would otherwise be acceptable in portrait mode.

Camera permits shutter speeds which are longer than ordinarily allowed for hand-held shots, and increases the ISO speed to near its maximum available value.

Night/Low-light

However, for some cameras this setting means that a flash is used for the foreground, and a long shutter speed and high ISO are used to expose the background. *Check your camera's instruction manual for any unique characteristics.*

Now that you are armed with this simple yet valuable information, let's put it towards some truly creative uses.