Basics of Making Sharp Images

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Viewing a sharp image is much more satisfying than viewing one that is not sharp in the right places. Not all images need to be sharp from front to back. Images with a narrow range of sharpness can add intrigue and can direct the viewer were to look. It is up to the artist to decide what is going to be in focus. Landscapes typically need a very deep depth of field.

Understanding and mastering these basics will help you make more purposeful and pleasing images.

For articles on making sharp images, refer to *Ask Me Anything – Notes*.

1. Practice – these skills are best learned through practice and application.
2. Are your eyes in working order? If you wear glasses, are they suitable for looking through the view finder?

Go Find Your Manual

3. Adjust the diopter. All eyes are different, and you must adjust the camera eyepiece to your eyes. Refer to your owner's manual to learn how to do this.
4. Learn how your camera indicates it has acquired focus. My Nikon's have a little circle that lights up and the focus square changes color (depending on the focus mode.)
5. Most cameras have a setting that determines if the camera will only fire if the image is in focus or if it will fire even if the image is not in focus. In most cases you want to fire only if focus is acquired.
6. Modern cameras have very sophisticated focus systems. Learn about your camera's options and capability. I highly recommend the site *Back Country Gallery* by Steve Perry. Steve is a wonderful wildlife photographer and instructor using mostly Nikon gear. But his videos are very helpful for anyone as is his e-book on the Nikon Auto Focus System. You will just need to translate terminology. Important choices you make are

a. Focus with ½ press or shutter or use Back Button Focus (BBF). I highly recommend Back Button Focus. See THIS on Back Country Gallery. You can Google Back Button Focus and your camera model to find out how to set this up.
b. When you direct the camera to focus with ½ press shutter or BBF

   AF-S will hold focus at that distance until you do the action again or click the shutter.

   AF-C continuously changes the focus distance until the shutter fires or you release the BBF.

c. Choose the focus mode. I use single point.

[ ]	Single point	The photographer selects the focus point manually; the camera focuses on the subject in the selected focus point. Choose for stationary subjects.
[ ]	Dynamic area	The photographer selects the focus point manually as above, but if the subject briefly leaves the selected focus point, the camera will focus based on information on the subject from surrounding focus points. Choose for subjects that are moving unpredictably.
[ ]	Auto area	The camera detects the focus point containing the subject and focuses automatically.
[3D]	3D tracking(11 focus points)	The photographer selects the focus point manually; if the shutter-release button is kept pressed halfway after the camera has focused, the photographer can change the composition and the camera will automatically choose a new focus point as necessary to maintain focus on the selected subject.

7. If you are using the rear screen, most cameras allow you to zoom in to verify focus before and after the shot. Mirrorless cameras have other feature to aid focusing (but really understand what they are doing).

8. At this point you should consider two things about your camera and lens. All modern cameras can make sharp photographs.
   a. But not all lenses can do the same. As the pixel count goes up and up, the need for good lenses goes up. A lens that worked fine on a 16M pixel camera may not be adequate for a 24/36/45M pixel camera. Read reviews and do your own tests in a controlled, stable environment.
   b. On DSLR's the path of light to the focus sensors is not the same as to the image sensor. The engineers try to make them the same, but they can be off a little due to camera and lens manufacturing tolerance. Many modern DSLR's can fine tune the camera/lens combination to assure proper focus. See your manual and the www.

Understanding and mastering these aspects of the camera only get you part way to being able to make sharp photographs. The next thing to do is to eliminate movement of the camera/lens and the photographer.

9. The most important thing to improve sharpness is to lock your camera down on a solid tripod. There are many excellent options but the cheapest is not one of them. You can buy a really good quality rig to begin with or two or three inferior ones until you finally buy a good one. If the situation does not allow a tripod, a monopod is a second choice.
10. Handholding is a way of life in many situations. Learning to effectively hand hold requires practice and attention to details on your settings.
    a. Focal length. Shorter focal lengths are easier to hand hold. A small amount of movement at the end of the lens at 24 or 35mm may not be visible. But that same movement on a 300mm lens will show up. Long focal lengths can require years to master and continuous practice.
    b. Shutter speed and focal length. A rule of thumb is that the shutter speed should be faster than 1/(focal length). For a 60mm lens 1/60sec. For a 300mm lens 1/300sec. These may work fine when you can exercise excellent technique. But that is often hard to do when you must get into contorted positions. I usually go 1.5 to 2 X those speeds since I'm old.
    c. Vibration Reduction or Image Stabilization are ways the camera designers compensate for camera/lens movement. Some systems are built into camera and some the lens where elements that move in the opposite direction are designed in. These can be helpful but do not cure all ills.
    d. Good handholding technique involves holding the camera close to your body and firmly supporting the lens. Brace yourself against a solid structure.
    e. Click the shutter with a smooth motion, not a jab.
11. The last part of camera/lens motion is camera shake caused by the operation of the camera. DSLR's must move the mirror out of the way and move a mechanical shutter. These can set up vibrations in the camera. If you are handholding the shutter speed can help mitigate this. If you are on

a tripod, you should make use a cable release or other features of your camera. On my Nikons I use this technique

a. Set the shutter to electronic first current which eliminates the initial shutter shock.
b. Set to mirror lock up which raises the mirror and eliminates the mirror slap.
c. Use exposure delay mode which pauses before initiating the electronic first curtain. (Note this is not the same as a self-timer. They operate differently.)

Now that we have the camera set up for success and we have good technique for stabilizing the rig, we must consider where to focus and with what camera settings.

12. Depth of field (DOF) is the distance between two planes in which the subject is in acceptable focus. There are many articles on DOF and how to calculate it. There are apps for your smart device. This is an excellent article https://photographylife.com/what-is-depth-of-field

    I refer to this site https://www.dofmaster.com/charts.html for calculations and I use a smart phone app called "Digital Depth of Field"

13. The choice of how much of the image to have in focus is your choice. You must balance focal length, aperture, and distance to the subject to achieve your desired outcome. As we have all learned and keep learning, photography is a set bad choices you have to navigate. One thing is always impeding another.
    a. Focal length. With the same distance to the subject and same aperture, shorter focal lengths have a wider depth of field.
    b. Aperture. With the same focal length and same distance to the subject, A wider aperture (f/4 e.g.) has a narrower depth of field than a smaller aperture (f/11 e.g.).
    c. Distance to subject. With the same focal length and aperture, a shorter distance to the subject has a narrower depth of field. This is why close up are so hard.

    d. Play with the calculators to get a feel for how these numbers work together.

14. Hyperfocal distance. Hyperfocal distance, at its simplest, is the focusing distance that gives your photos the greatest depth of field. For example, consider a landscape where you want everything — foreground and background — to appear sharp. From another excellent article on Photography Life https://photographylife.com/landscapes/hyperfocal-distance-explained#what-is-hyperfocal-distance
15. Rule of thumb
    a. If the subject is a distant object and the foreground is not important, focus 1/3 into the frame.
    b. If the subject is close (not a closeup) and you want to emphasize it, focus on the subject.
    c. If the subject is close and distant objects are important, focus at twice the distance to the near object.
    d. Close ups. When starting out, we all gravitated to close ups which are the most difficult to master. Keep your distance.
16. Subject motion can also cause blurry photographs.
    a. Sometimes you want to show motion with blur; in that case you slowdown the shutter. For instance, I think 1/8, 1/15 and 1/40sec can make interesting water blur. You can go much longer, seconds to minutes to get a silky smooth effect which is quite dramatic sometime. You will need neutral density filters to block the light on some days.
    b. If you want to freeze motion, you need higher shutter speeds. See the chart below for examples.

Shutter Speed	Use	Notes
1/4000	Freezing very fast movement	This will freeze the movement of things like high speed trains, etc.
1/2000	Birds in flight	This will clearly show the bird's wings, slow down shutter to blur the wings
1/1000	Sports and quickly moving people	This will freeze action, to show more movement use a longer shutter speed
1/1000	Freezing fast cars, motorcycles, etc.	This will freeze quickly moving objects
1/250	Portraits	For wider aperture/shallower depth of field, use a faster shutter speed
1/250	Freezing walking people or slow moving animals	This will freeze the movement of objects that aren't moving fast
1/150	General wildlife	For animals not moving especially fast
1/125	Panning for cyclists, automobiles, etc.	Follow the subject while the shutter is open so that subject is in focus/background blurred
1/125	General landscapes	Longer shutter speeds can show movement in grass, water, and the sky
1/15	Panning for running athletes and animals	Will keep subject in focus and blur background to give the feeling of speed
1/8	Blurring fast moving water	The faster the water, the shorter the shutter speed can be to still show movement
1/4	Panning people	Especially useful for street photography or when wanting to show the movement of people
5+ Seconds	Blurring waterfalls, rivers, etc.	Shorter shutter speeds will retain some texture, longer will produce a smoother, more dreamy effect
20+ Seconds	Astrophotography	Use the fastest shutter speed possible at your desired aperture and ISO to avoid the beginnings of trails
10+ Minutes	Star trails	May be done using a single long exposure or, more commonly, a series of photos stacked in post-processing

c. Wind can also cause subject motion. If you just wait, the breeze will usually die down. Sometimes you should just give up.

17. Sharpening in software can only do so much and it is easily overdone. I do sharpening in Lightroom which tries to protect you from yourself. The LR defaults are typically good enough. For output sharpening – export to a file or print – I use the LR setting Standard. The LR algorithms for output sharpening are excellent and much better than most people can do.
18. Topaz Sharpener AI (artificial intelligence) is new to the scene. Some of you had questions so I downloaded a copy. It operates in three ways. Normal sharpening function. Recover out of focus shots. Reduce motion blur. You choose which one. It appears to be quite effective as seen in these photos. (Click to download.) Before After

    While these are very impressive results, I don't think it should be your go to option. Save it for that once in a lifetime shot that you got excited about and muffed. Like the time I grabbed a blurry shot of Big Foot; sorry I threw it away.

Let me know if you have any questions.

Dennis