How To Become A Photographer

"Learn Photography at Home"

by: *Mike Metzing*

Technical skills required to become a successful photographer:

The ability to work in all formats, especially large formats.
Mastery of studio lighting.
Knowledge of many photographic “tricks” to make objects visually appealing.

By understanding your tools, you can achieve any type of photography skills and styles. Just reading a book about photography will not turn you into an accomplished photographer! You must practice at every opportunity and refine your skills through trial and error. Study your camera’s manual usually included with the purchase of a new camera. If you happened to have purchased a used camera in good working order without a manual, then how do you know what all the buttons and menus will do? Simply contact your local camera dealer or go on line and visit your cameras manufacture and purchase a manual from them. Every style of camera is different. What can be done with one camera may not be an option on another. So do your homework BEFORE going out and investing in the most important tool in your new trade or hobby. If you already have purchased one, then learn everything that the camera can do by simply studying the manual and practicing by shooting a large amount of images and studying what works for you and what don’t. The main thing here is to practice, practice, practice!

This book is to introduce you to the basics and what is not included in a camera’s manual. We will look at shutter speeds, apertures and their relationship to each other as well as lens types (and differences), image composition, cameras, ISO’s, how and why to use filters and of coarse your most important tool, lighting.

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cameras
filters

Aperture

Otherwise known as F-Stops

Controls the volume of light admitted to the ccd or film and the depth of the sharply rendered zone.

Understanding aperture seems somewhat difficult to some people. But really it is very simple. Think of aperture as depth of field. (How much is in focus between you the photographer and the subject you choose to shoot.)

The aperture numbers are in fractions and differ somewhat from lens to lens. (more on lenses later). First what does the "F" mean in F-stop? Think of this as a "field" or "focus" range. What is in focus and what is not in focus in the picture that you are composing. Most lenses start with an aperture of F2 or F2.8 and can range up to F35 or more, depending on your choice of lens. The smaller the F stop that is used (the larger numbers, F22, F16, F11), the more that is in focus from front to back. By smaller we mean the larger number. This is what confuses new photographers the most. Remember that the aperture numbers are fractions and the numbers represent the bottom denominator. Lets use the F stop of F16 as an example. What does the 16 mean? The 16 is the bottom number (or denominator) of a fraction. When using fractions, you begin with a whole number of 1. This number is the lens, no matter what size it is. The top number or denominator in our fraction. In our example, when the lens is set to f16, the iris or "hole" in the lens is 1/16th as big as the lens is long. The aperture numbers are determined by dividing actual diameter of the aperture opening into the focal length of the lens. An example would be; an aperture of f4 on a 55mm lens would have to measure 12.5mm across to fit into the lens focal length four times.

In Figure 1 we have the same lens with 2 different F-stops set. One at f2.8 and one at f16. Or 1/2.8 or 1/16th respectively. See how f16 is a smaller iris? It takes longer for light to get through the lens because of the smaller hole, requiring more time to get more of the picture exposed onto the ccd (digital camera) or film.

f16

f2.8

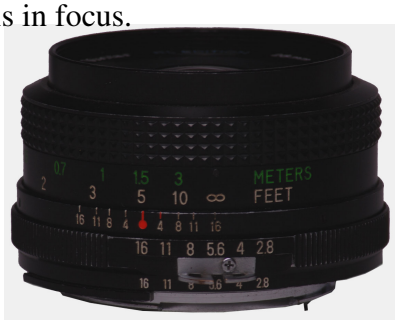
Figure 1

Now lets say you want to shoot a landscape shot. Thinking on the subject of composition, what is included in your image, you may want something that is close to you in focus as well as far away. What f-stop will get the results you are looking for?

Ask yourself this. Which one is bigger? Which one will give me the most "in focus" between the two? A useful rule of thumb to use is; the bigger the number you use in your f-stop range for the lens you are using the more "in focus" you will have in the final print.

In other words “The bigger the number, the more in focus”. Notice that if you shoot an image up close with most point and shoot type cameras, that image may be blurred if closer than 3-4 feet because of the aperture of the fixed lens.
Let’s set up what is called a hyper-focal distance. This is how you get the maximum “in focus” the lens you are using will allow. Set your f-stop on your lens to the largest number available. Use f16 in our example. (See figure 2). All cameras are very different and some lens settings may need to be set right on the camera depending on brand, make and model. Our example is using a manual focus lens. We will get into more about different types of lenses and the different effects they can produce later. Setting hyper-focal distance cannot be done with the autofocus on if you are using a digital camera. Simply turn off the autofocus and put your camera in its manual mode while you learn. You will not learn anything having the camera doing all the thinking and you will not always get the results you are looking for. A camera is like a computer and only does what it is told to do. One thing that does need to be mentioned here is that all lenses can focus on infinity. Some lenses will put an infinity symbol on the focal scale. The sideways 8. ∞ (See figure 2)
As you see in figure 2, we have set the 16 on the red f-stop indicator. Now turn your focus ring until your infinity mark on the scale is above the 16 in the scale and the shorter distance is above the other 16 on the other side of the scale. In our example, everything from infinity down to a little less than 3 feet (or 1 meter) is in focus.

Figure 2



If you look through the viewfinder you will see that everything is not in focus. This is because you have told the camera what you want instead of allowing it to do it for you. Now you have the leaves in the distance in focus as well as the fence in front of you. Everything is in focus between you and the trees. Keep in mind that in our example anything closer than about 2 ¾ feet will not be in focus. So adjust your composition accordingly.

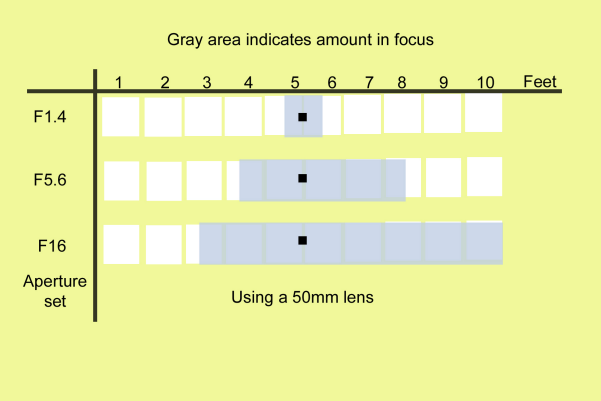
We will get more into composition in another chapter

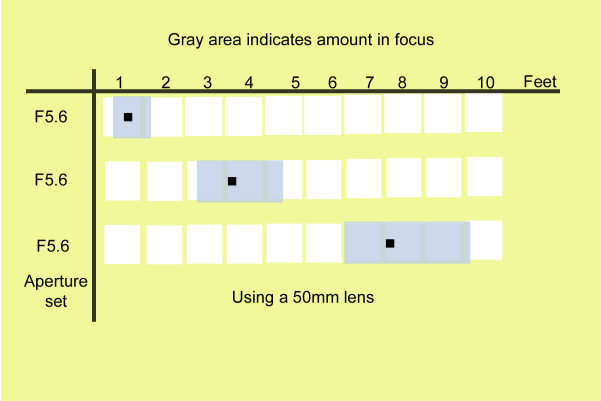
More notes on apertures.

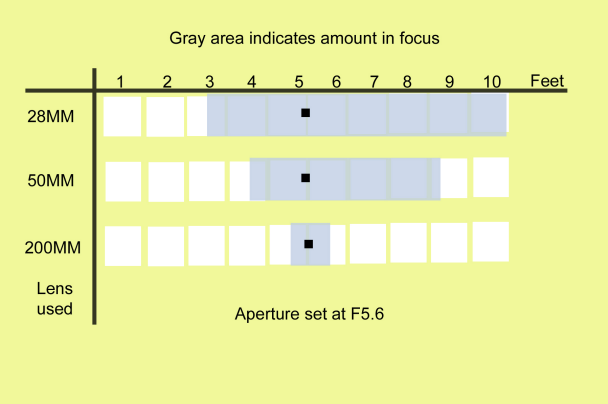
Filters placed in front of the lens can change the amount of light traveling through the glass therefore requiring you to open your f-stop by the filters recommended f-stop(s). Again, your shutter will have to be slowed down as well to maintain proper exposure.
Each f-stop is half the size as the preceding one and twice the size as the following one starting at the lowest number and going up. (F/2 through F/35, some f-stop scales can range lower and/or higher depending on your choice of lens).
Each time you open up by 1 f-stop, you are doubling the amount of light that is hitting the film or ccd. Remember! DOUBLE EACH TIME!
Opening 1 stop admits twice the light.
Opening 2 stops admits 4 times the light.
Opening 3 stops admits 8 times the light.
Opening 4 stops admits 16 times the light.
So if you decide to open up 3 stops from your initial starting point, then don't forget that you are allowing 8 times the light in as before. That's 2x2x2.
Shutter speeds will have to be adjusted as well to keep the same exposure. You may want to over or under expose your image for a special effect; therefore you could just leave the shutter speed alone.

The following 3 graphs show how changing the aperture, focal distance or lens can effect what is in focus and the final composition in your print.

The small black squares indicate the point of focus.







Apertures with studio lighting

This section will be covered again using an on camera flash later in shutter speeds and in lighting.

Each light comes with what is called a "Guide Number" by the manufacturer. This number is only a guide and considered a starting point to determine what f-stop to set your camera. To be more accurate, tests need to be done to come up with the lights actual guide number but the number that comes with your kit should provide good enough results.
In this exercise, let's assume you are using a single light source and have set your studio light at 15 feet from your subject. Let's also assume that the studio light in use has a guide number of 300.
The required f-stop can be found by dividing the guide number 300 by the distance between the subject and the light, which in this case is 15 feet. The answer is 20 in other words, F20. If you take a look at the lens you have in use, you will notice that f20 is not an option in most cases. Therefore you must use the closest f-stop that represents f20, usually f22. If the lighting appears overexposed due to the difference in f20 and f22, simply move your studio light a little closer. See figure 5 and its explanation in the next section.
What if you decided you need your light at 30 feet from the subject? It is as simple as doing the math. Again 300 ÷ 30 = 10 (or F11, the closest f-stop to what you need. Some cameras will allow you to set your aperture between the settings on the lens scale.)

The "ready for anything" setting: This is good for sudden action or outdoor candid shots. Set your aperture at f16 with the appropriate shutter speed (discussed in the next section). Focus at about 12 feet away with a 50mm lens. Everything from about 7 to 30 feet will be in focus. You may have to use a higher ISO (International Standards Organization) setting (digital) or faster film.

Shutter Speeds

Shutter speeds control how long the lens lets the light in. Again this is looked at in fractions. The bottom number or denominator in a fraction. Shutter speed is based on time. The longer the lens is open the more blurred or overexposed things can get. However, this may be the image you are trying to achieve. Looking back at the previous picture, you can see that shutter speed was not an issue there. All we needed was everything to be in focus. What if there were very high winds that day? Would the same results have been achieved? This is where you begin to think about speed and freezing the action of the blowing trees. How do we do that? Set your shutter for the fastest available shutter speed with the aperture you have already chosen. Now you can't just change one of the two settings (aperture or shutter speed) and get the correct results. Every scene is lit in its own way and requires a certain amount of time to expose to a ccd or film. The brighter the scene is lit, the less time it takes to expose it correctly. Sometimes one of the two settings must be compromised to get the results you want. The best way to know what settings to begin with is to meter the scene. If you have a meter built into your camera, this will help in getting the correct effect that you want. If not, you can purchase a separate meter to use, which will work for any camera as long as you can set these two settings. Lets take a look at figure 3. In this example, we will assume that the image we are shooting requires us to set our aperture at F5.6 and our shutter speed at 1/60th of a second. But what if we wanted a slower shutter to show movement instead of freezing it?

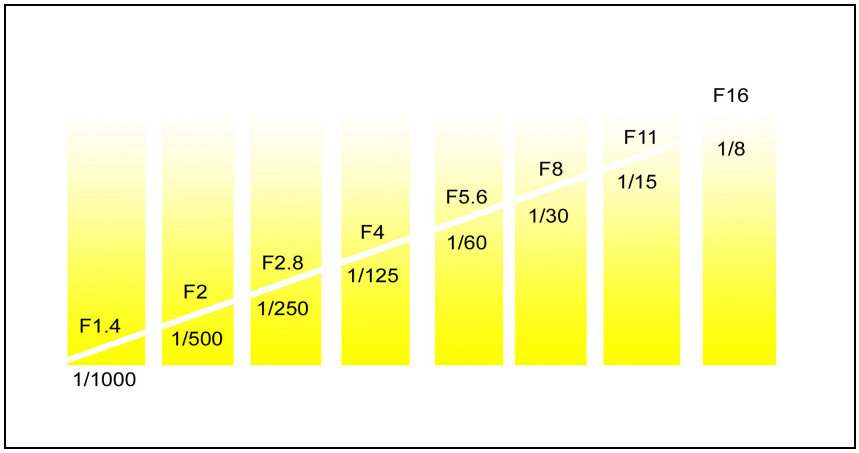


Figure 3

As you can see in the graph you can choose any settings you see together based on the light you have metered at the shoot. If you change the shutter speed to get the results you want (a slower shutter in our example) then you must change the aperture and compromise the depth of field. So you must ask yourself this. What is more important in the final print? Using a slower shutter to show movement in the image may require the use of a tripod. A general rule of thumb is to place your camera on a tripod when using a shutter speed that is slower than the lens is in mm's. For instance if you are shooting at 1/30th of a second then do not hand hold the camera if the lens you are using is a 135 mm lens, in other words, the slowest shutter to use with a 135mm lens is 1/125th of a second.

In our example we want to show movement. So by choosing a slower shutter of 1/15 (and a tripod) then we need to set the aperture of f11 to get the correct exposure for the final print. This will give us plenty of movement and give us good depth of field as well.

Panning the camera with the movement of the subject is another way to demonstrate movement. Look at the following picture. You can see how the combination of "panning" with the car and a slow shutter causes blur in the background and the movement of the car. To pan the camera means to point the lens at the subject and move or "pan" with them as they cross the scene while pressing your shutter button.

Be sure to follow through with your pan as you would when you swing a baseball bat at the ball even after the shutter closes for the best results.

Say you want to freeze the action. Instead of 1/15, choose a faster shutter, let's use 125th of a second, to freeze the movement. Again the results you can achieve are based upon the amount of available light without a flash. You may not be able to get to the shutter speed you desire due to the aperture setting you are using. **See figure 3**. *Keep in mind that the above graph will be totally different with each metered scene due to the time of day, the amount of shade and/or indoor or outdoor lighting.*

At a faster shutter speed of 1/125, the action can be frozen but using the scale above, the depth of field would be rather shallow and leave little room for focusing errors. The Skate Boarder image below was shot using 1/60 shutter speed on a partly cloudy day with a smaller aperture for more depth of field. In other words, the lighting conditions were correct to achieve action stopping photography using a smaller aperture. It helps to freeze the motion at the height of the action. Try to find that instant in time when the action is at its peak and then press your shutter release using a faster shutter. Helping to "freeze" the action and result in a finer looking print.

This helicopter was shot using too fast of a shutter speed. Freezing the blades and causing the helicopter to appear frozen in the sky. Slowing the shutter down would have resulted in a better-looking print with the blades being more blurred to show motion. Of coarse we would have to adjust the f-stop to accommodate the shutter speed.

Let's revisit figure 3 below. Think of the link between the shutters speeds and apertures as a pair of triangles. Each section stands for the amount admitted to expose your image correctly. Each set together equal exposure. If your meter reads that you need an aperture of f2.8 at 1/250th of a second shutter speed then you could choose any of the combination of "exposures" by changing both the shutter speed and the aperture as represented in this particular scale. F1.4 at 1/1000, F2 at 1/500, F4 at 1/125, etc.

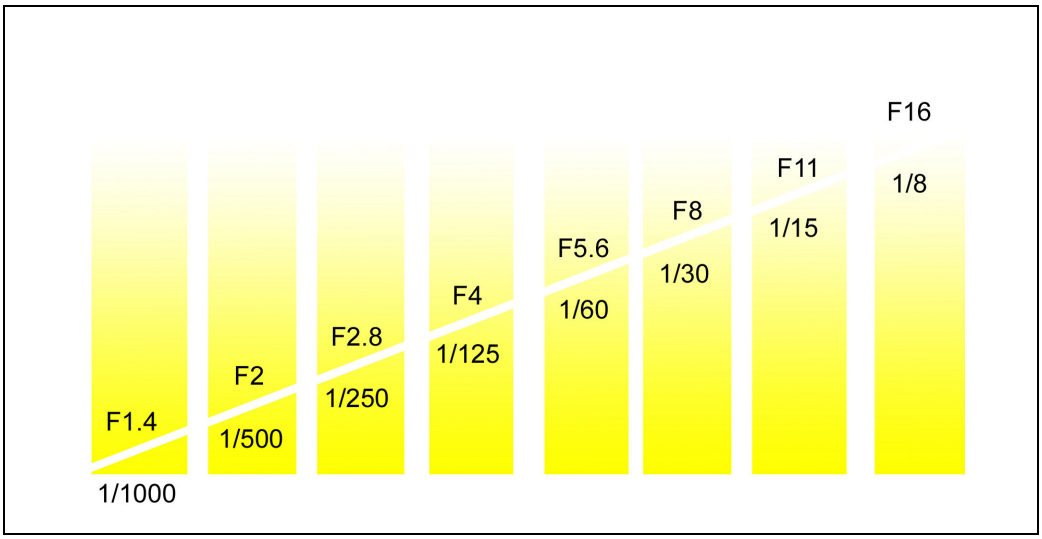


Figure 3

What if your meter reads that you need 1/60 at F11? That's great! Now look at figure 4. The same scale applies. It just looks somewhat different because of the different amount of lighting that is falling on your subject. The sections are simply realigned to show other settings that will also let in the same amount of light. Whenever you stop down one f-stop from the correct exposure, you must compensate by going to the next slower shutter

speed so the exposure remains the same. The same works for the other direction as well.

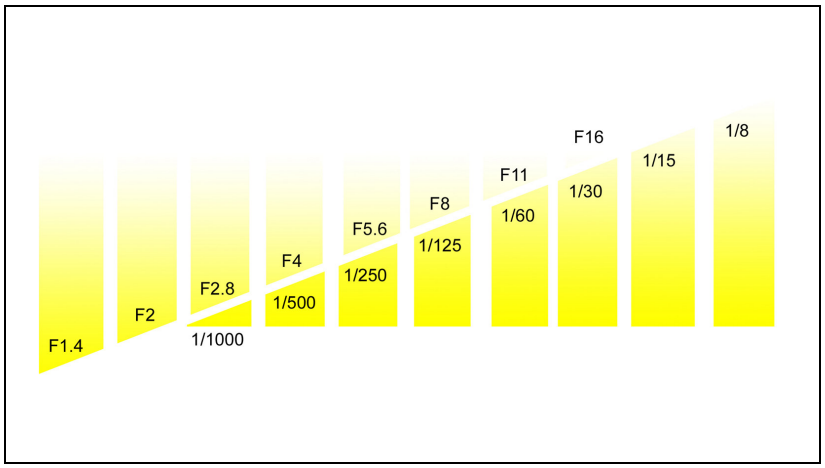


Figure 4

What if you were using a flash attached to your camera? How much light does the flash put off? This all depends on how strong the studio light or flash is. Each type of light varies on intensity and output and the distance the light needs to be relevant to the subject. Generally a guide number is included with the studio light or flash by the manufacturer as a starting guide to where to place the light. Your f-stop would be determined by dividing the guide number by the flash to subject distance. For example, Let's assume we have a camera flash with a guide number of 110 at 100 ISO (more on ISO later) and the subject is 10 feet away. Divide 110 by 10 and your total is 11. Therefore set your f-stop at f11. Now you can use any shutter speed that corresponds to the maximum flash shutter speed or slower. Usually around 1/250.
Think of the inverse square law. If you double the distance from your light source to your subject, the observed intensity of light is decreased by one half. Meaning, if you shine a flashlight into space you will not be able to shine it on a flying plane at night. Why? Because for every time you double the distance of the light, it is shining only half as bright as it was before.. So even moving it 4 feet the light can be 1/8 as powerful as it was before you moved it (depending on the flash guide number). Each time the distance is doubled, the light is halved. See figure 5.

When using a flash, the background can now be darkened and lightened depending upon the shutter speed you choose. Remember we said that the shutter speed controls the time the light is admitted to the ccd or film? The faster shutter, say 1/250, will not let enough light in to fully expose the background well. So slowing the shutter down to 1/30 will allow more light to pass through for a longer period of time thus allowing more time for the background to expose after the flash has already exposed the subject and foreground.

Light Intensity =
1 Divided by the Distance, Times 2

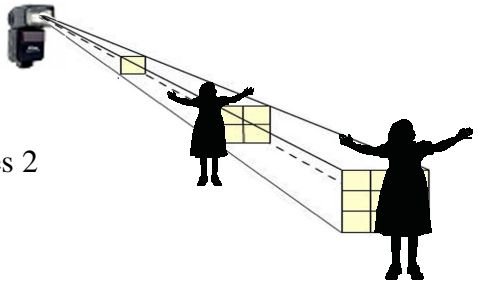


Figure 5

F- Stop =
The flash guide number divided by the flash to subject distance

You can use the below guidelines if you do not have a meter or your camera's meter is broken or in need of repair. Divide 1 by the ISO you are using to get your shutter speed and start with the "Sunny F/16 Rule" and that rule is "In bright sunlight, the normal exposure of a image at F/16 is 1 divided by the ISO that you are using".
For instance; ISA 100 would be 1/100 @ F/16.

Bright or Hazy Sun with average subjects	1 Divided by film speed = shutter speed @ F/16
Bright or Hazy Sun with light colored sand or snow	1 Divided by film speed = shutter speed @ F/16 Less one stop
Weak or Hazy Sun	1 Divided by film speed = shutter speed @ F/16 Plus one stop
Cloudy, Bright Light Overcast	1 Divided by film speed = shutter speed @ F/16 Plus 2 stops
Heavy Overcast Sky or Open Shade	1 Divided by film speed = shutter speed @ F/16 Plus 3 stops

You can use the palm of your hand to meter on if you can't meter your subject. Be sure the light conditions are the same for the angle and intensity of light. Caucasian skin, increase the exposure by 1 f-stop more than the meter recommends. For dark skin, use the settings indicated by the meter.

It does not matter where the camera is in regards to the subject as long as you have your light source placed at the correct distance plus using the right f-stop.

Reciprocity Effect: Exposures longer than 1 second (1:1) may cause unexpected color shifts. Film responds less than normal when the exposure time is very long.

Shutter speeds using studio lighting:

Your camera has a specified "sync" speed for use with any flash. The burst of light from the flash does not occur instantly when the shutter release is pressed, nor does the shutter instantly open after the shutter release is pressed. So it's necessary to use a shutter speed that will keep the shutter entirely open during the time the burst of light occurs, "your camera's maximum sync speed". However, you can shoot at slower speeds with great results, but if you shoot at a higher shutter speed, only part of the frame will be exposed, leaving your image half dark with the other half being lit with the flash. Most of the pro slr cameras (digital and film type) sync to 1/250, with most amateur cameras syncing to 1/125.

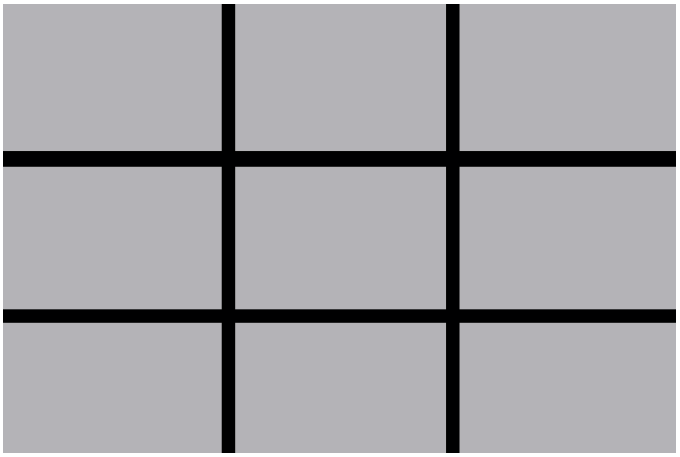
If you are using a professional slr and your camera will sync up to 1/250 of a second, you can use anything from 1/250 and slower. This will alter the background lightness and darkness. The slower shutter speed allows more time for the light to spill onto or into the background area rending the overall scene brighter than with the fast 1/250 of a second.

In the studio you may want to adjust your shutter speed depending on how deep the background is from your subject and how much of it you want exposed. Of coarse your lights will need to be set according to what your f/stop recommendations are for the distance between your subject and lights. You will also need to take into consideration of subject movement. Do you want to freeze action or are you simply taking still portraits? It takes a faster shutter to freeze fast action. $1/60^{th}$ of a second is a fairly slow shutter and could introduce some camera shake if not held perfectly still. Use a tripod with slower shutter speeds.

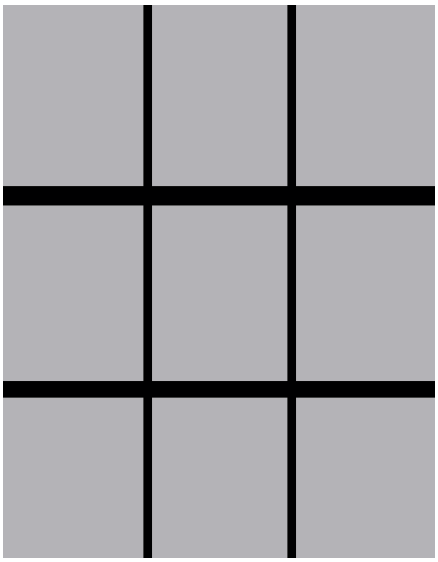
Composition

The dictionary describes composition as the combining of distinct parts or elements to form a whole. What is included and what is not included in your final image and how to place the image elements within the frame to give the message of what you are trying to assert.
The visualization of a photograph involves the intuitive search for meaning, shape, form, texture and the projection of the image format on the subject.

Lets begin with the rule of thirds. Imagine your frame divided into 3 sections both horizontally and vertically. See figure 6.



Horizontal



Vertical

Figure 6

When composing your image, try and place the focal point close to where the imaginary lines intersect. Some images may require you to actually break this rule but generally this is your starting point. Look at the image below with the imaginary lines overlaid within the frame. See how the subject of the picture is not in the center but close to an intersecting line?

This goes against everything your parents have always told you but watch a lot of TV. This is an excellent and free way to see how other photographers are using composition. Look at professional photographers websites. They contain many different types of professional images with good composition. Look at what they have included in the image and its placement within the frame.
Always check for background clutter in the viewfinder, which distracts the eye away from your center of interest. Quickly observe what you see in the viewfinder before pressing the shutter release button. If you have and know how to use any imaging software, you could simply re-crop your image on a computer but try to get the most out of your image with the camera first without having to rely on other things to "correct" your errors.
When the lines of your subject lead your eye vertically then shoot the image that way. Don't be afraid to turn the camera. Have you ever looked at someone's pictures that NEVER turn the camera? Do you think a portrait of someone looks better composed horizontally? They hardly fit in the frame and you are left with a lot of "space" to the left and right of the person in the picture. If you try to get their whole body in the print then they are very small and hold no significance. If you have multiple subjects in the frame then yes, shoot it horizontally.

∞ Other composition tips ∞

One thing I could never figure out is why anyone would want to cut off someone's limbs in a picture. If you must cut off limbs then the best way to do this is to do it above or below the joints for best results.

Does your subject appear to be moving? Allowing more space in the front of the action instead of behind it will create the feeling that the subject has somewhere to go instead of appearing like they are leaving the scene.

Including a fence, road or even a shadow can lead your eye to the images' main point of interest.

A beam of light can be made to stand out by blowing smoke through it.

Something to keep in mind is that clothes and hairstyles can "date" a picture and limit its use if you are wanting to get into stock photography. This is the same for city skylines because new buildings are always being built and skylines are always changing.

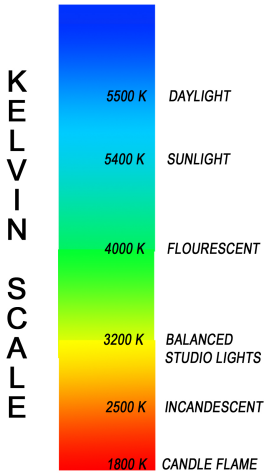
Enjoy seeing others not knowing what they are doing when they are shooting pictures of themselves or others. These are your future customers. Its because of them you can turn a hobby into a cash machine.

Lighting

Technically, light is the spectrum of electromagnetic radiation, which can be seen by the human eye; also, the source of light or its use in painting such as the illumination of a subject or an aspect of a piece of work for emphasis. Without light there would be no form, color, or texture.

In this section we will touch base on the different kinds of light and how to utilize it to create different effects. This includes available light, studio and the on camera flash.

Let us start with available light. Available light is any light source that is available at the location you are creating an image. This could be (but not limited to) direct sunlight, sunlight through a window or the tungsten or fluorescent light in the ceiling.
The first thing to know is that each type of light puts off a different color to film and the ccd in digital cameras and is measured much like the temperature outside but in Kelvin degrees instead of Fahrenheit or Celsius. See figure 7. There are different films that react to different types of light meaning they are "balanced" to that color temperature. Most digital cameras have a white balance setting, which can be changed to be "balanced" with the degree (or color) of the available light or strobe. See your manual.



Generally referred to as color temperature, the scale used by photographers to measure the warmth or coolness of light. The color of a light source is specified as degrees in Kelvin. The scale is expressed as a range of temperature from about 1000 K (firelight), to 10,000 K (clear blue afternoon sky) & beyond. In general photographic applications, the most commonly used color temperatures are 3200 K, (tungsten), and 5500-6000 K, (daylight).

Other than the sun, available light produces continuous lighting and is normally not bright enough to permit action stopping shutter speeds.

Figure 7

A light ratio of 3 to 1 (3:1) is normally used for portraits taken in a studio. What if you wanted to reproduce this type of lighting outdoors? First understand what 3:1 means. This is the relationship of how bright the highlights are compared to how dark the shadows are. The first number is how bright the main light hitting your subject is. The second number is how much darker that we want the shadow areas to be compared to how bright our "3" (first number) is. Which means that the shadows are 3 times darker than the bright area. If the sun was shining very brightly and you needed to lighten the shadow area because of deep dark shadows, reflect a large white card into the shadow area to soften them to a 3:1 ratio. The closer a reflector board is to the subject, the lighter the shadows will be. This becomes much easier when using an incident light meter. If you have a light meter built into your camera then you could zoom in and read your aperture

settings for both the dark and light areas and adjust your lighting to be 1 to 2 stops difference. Your camera does not have to be focused to get a correct light reading from its built in meter.

If you are using daylight balanced film and shooting under any other light source other than “daylight” such as office fluorescent bulbs, filters can be used to re-adjust the color balance for correct exposure. In this case you would use an FL or FD (depending on brand) filter to remove the green cast that these types of bulbs put off. In most cases, your eyes will adjust to what is natural but cameras see color of the scene like it really is. This is why filters (or white balance settings) must be used to tell the camera what you need to color correct the image. More information on filters and their uses will be covered later in the lens section including charts for what filter to use, when and why.

This brings us to the on camera flash. You use artificial lighting of any type for one of three reasons.

1. To reveal or emphasize certain details of the subject.
2. To create a certain mood or impression of the subject.
3. To do both 1 and 2 simultaneously.

Many cameras have dedicated flashes. This means that a certain camera and flash was specifically designed to use together. Many have what is called TTL (through the lens) technology. The amount of flash is monitored through the lens. By setting up the correct settings for the situation at hand, you can allow the camera and flash to do all the work. Nothing would be simpler than just mounting the flash onto the camera and letting automation take over. What if your TTL flash fails while doing a photo shoot and your only back up was an older flash from a previous camera? With the guide number of the old flash and a little knowledge you can continue with your photo shoot.
Photographers without the benefit of TTL camera systems must control the intensity in a different way. Looking back at figure 5 in the previous chapter, we learned about “flash fall off” or as we called it, Inverse Square Law and how to use your flash’s Guide Number to determine your flash to subject distance.
The sensor in the flash itself can be controlled to produce the desired level of light, which can be set for any light ratio after determining your proper f-stop using the available light. Most flashes have 2 – 5 settings in their automatic mode (not TTL). Each setting is marked with a different f-stop and is usually also color-coded. Some also include a flash distance scale.
First meter the available light for your proper aperture. Choose the highest shutter speed at which your flash will sync to. Then balance your exposure with the recommended aperture. Lets assume the metered scene is 1/250 @ F8. Now you need to choose one of the flashes auto exposure settings. In our example if you choose F8, the flash output would be the same as the available light. This produces too intense of a light to be used as a fill light. Instead, you must trick the flash into putting out a weaker light. Do this by switching your flash to read the next “more open” aperture. In this case it would be F5.6. Now the auto sensor in the flash will quench the light when it has put off enough illumination for an aperture of F5.6. This is one stop less light than the metered F8 for the subject. If you wanted 2 stops less light then simply set the sensor for F4. To make the flash stronger than the available light, set the sensor for an F11 reading etc.

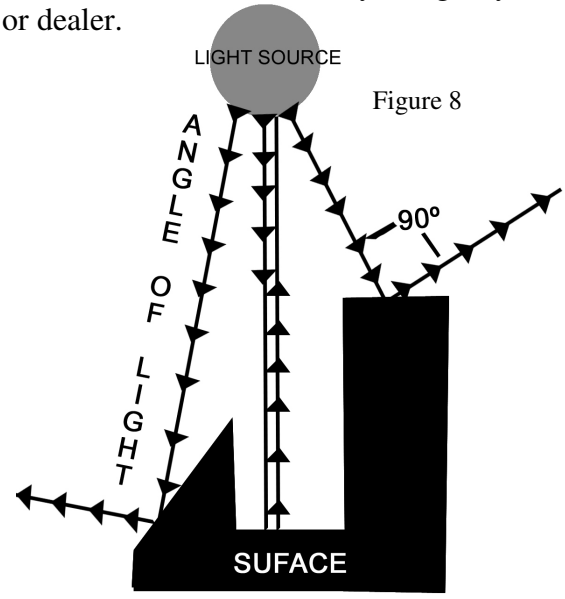
If there are no distance scales on the flash then you will need your guide number. Divide the guide number by the available light aperture to find the required flash distance from the subject. This will make the existing light and flash about equal in intensity. Using the inverse square law, (see figure 5) move your light accordingly to adjust intensity.

A. You can reduce or increase the existing light without affecting the flash by changing the shutter speed. Be sure to keep it at or slower than the flash sync speed.
B. Changing your aperture affects both light sources equally.
C. Move the light source farther from the subject to subdue the flash in favor of the existing light.
D. Move the flash unit closer to the subject (with the corresponding decrease in aperture) to keep the flash exposure constant while reducing the existing light effect.
E. As a rule; a single light should be placed no closer than 8 times the subject depth as seen from the light position, not the camera.

Light travels in straight lines and does not bend. This is why you sometimes see redeye in some images. When the flash is positioned too close to the lens the light is reflected back through the pupil off of the back of the eyeball thus reflecting the color of the inside of the eye which appears red. See figure 8.Try to mount the flash off camera by using a sync cord or TTL cord available at any camera store or dealer.

LAW OF REFLECTION

Figure 8



Notice that the angle of incidence is equal to the angle of reflection.

- The rays of light which strikes the surface are called the incident rays.
- The rays of light which leaves the surface are called the reflected rays.

The intensity of reflection depends upon the darkness or lightness of the surface. Darker surfaces reflect less light.

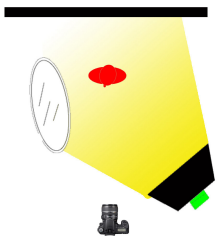
Flash duration and color shift: The flash tube normally contains xenon gas, which must be ionized to create a light of the desired color temperature. As the triggering current ionizes the gas, it creates the blue portion of the color spectrum first. Flash units that are equipped with automatic exposure circuitry may at times prematurely reduce the current density (flow) to the flash tube and halt the ionization before the full spectrum has been achieved. Although this is rarely a problem, it can occur when you are using an automatic

flash unit in an extremely close flash to subject setup. Using the manual flash settings will help you avoid the color shift recorded during exposure. In other words, if you are shooting an orange flower using your flash at close range on automatic, the flower may appear a different color when viewed on film or digital image.

If you understand how to determine your light to subject distances using Guide Numbers and/or a light meter, then you are ready to get into **studio lighting** for portraits as well as many other subjects needing a controlled lighting environment.

There are many types of studio lighting choices. We will explore the most used "Daylight" balanced lighting using strobe instead of continuous lighting. Continuous lighting is just that, "continuous". These types of lights are usually hot to the touch and stay on during the photo shoot. Some are equipped with a cooling fan to help keep the lights from melting too much of the models makeup or causing the subject to squint or sweat. If you are going to be shooting a lot of pictures of products for advertising, this may be the type of lighting you want. For now we will assume that you are shooting people as your subject matter and include diagrams of single and multiple light setups. Distances are not included for the simple reason that I have no way of knowing how strong (your guide number) or what type of lights you are using. You will need to have a light meter or use your Guide Number to get your light to subject distances.

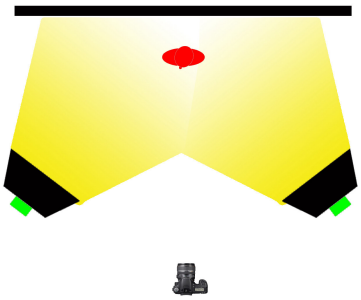
- Once you have figured out your light to subject distance, place your single light source close to the camera but slightly off to either the left or right side. Set the height to just above and angled down towards the subjects head. Place a reflector board to the opposite side of your subject from where the light is, set close enough to get at least a 3:1 light ratio.
- In the studio, try to put at least 6 feet between your subject and the background. If the light(s) are angled down, any shadows will be cast out of the picture taking area.



Single Light Setup
Using 1-Reflector

The height of the camera should be at eye level to your subject as a starting point. It also does not matter where you place your camera in regards to the light. This depends on how you want the light to spill across your subject in the image. Don't forget to look for light spilling into your camera lens and use a "GOBO" (short term used for go between) to block any light from entering into any unwanted areas in the scene and the camera.

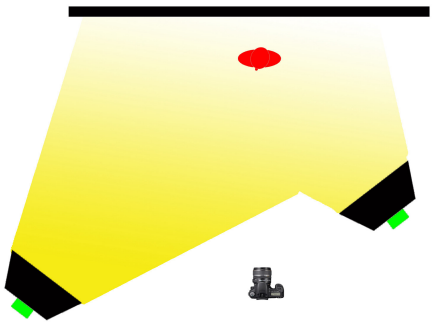
Sharpness of shadows will increase if the light source is moved closer to the subject and decreased as it is moved away from the subject.
For instance: Subject position lies from 3' to 6' from the camera….
If a light source is 3' from the subjects nearest part, the farthest part will receive ¼ the light than the nearest part. If the light is moved to 9' from the nearest part, then the farthest part will receive a little more than ½ the light from the nearest part, which is less noticeable making a lower subject contrast from front to back.



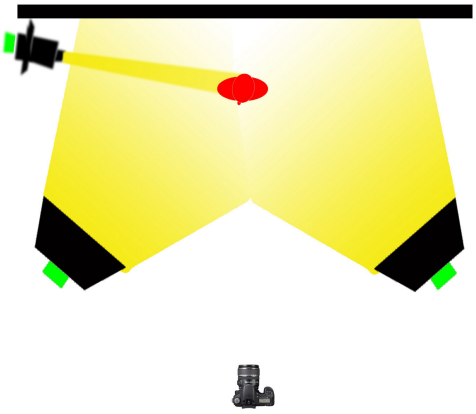
Two Light Setup

- If you are using two lights with the same amount of power (equal Guide numbers) with variable light outputs you can place them the same distance from the subject. Set them at 45 ° from the subject. Adjust the first light to full power and the second one to ½ of the first light. This is the difference of one f-stop.

- If you cannot adjust your lights power output, use your guide number to figure out your subject to light distance. Then use the inverse square law. As the light source is moved away from the subject, the amount of light falling on that subject diminishes by 1÷Distance X 2.



Two Light Setup



- Adding a third light can be difficult to get right and the results will not be what you expect at first. This gets easier as you practice and check your results.
- The hair light should be set at 1 f-stop less than the main light as a starting point. (Darker here for illustration)

The illustrations above are starting points in regards to light placement. The final effect you want to achieve depends upon what you want in a finished print. Adjust your lights' location in regards to your subject to achieve the effect you are after. Be sure to keep the studio lights "higher" and pointed down towards your subject to eliminate unwanted shadows. Try moving the main light closer to the camera position for best results. Normally you don't want to see two sets of shadows behind your subject. This usually does not have a pleasant effect. Place and set your studio lights accordingly to avoid "double" shadows from two directions.

When you begin using multiple lights in your photography, start with just one light and move it to the left and to the right, above and behind, at different angles and compare the different results gained by simply moving the light around. Now add your second light and repeat the steps you took with the single light source, first moving only the added light then combining the re-placement of both lights. Keep adding lights from different angles and heights until you are happy with the results. Learn how moving lights around an object or subject can change the mood of a shot. Understand how all of your artificial lighting works and when it's best to use it for different types of photography. Be sure to keep a lot of notes and mark what you feel are the best results to your taste. Remember that there are standard rules to photography but rules are meant to be broken and your taste in photography is what separates your images from every one else's.

Cameras

In this section we will only touch on the subject of the different types of cameras available. Most people that are first learning photography usually are starting out with more simple equipment and/or professional slr's. There are many different film sizes and ccd's in many different brands. One brand of camera may do just what you need where another of the same type of camera of a different brand may not have the same feature or function you need to get the results you are looking for in the final print.