

Digital Camera Basics

1. RAW or JPG

Before shooting any photographs, one of the first decisions you need to make is,

What format you are going to shoot in?

What does this mean to you?

- Digital cameras save your photographs in files just like a computer. In camera these files are stored on memory cards. When full you can remove these cards, and transfer the files to your computer for further processing, editing, and/or printing and emailing. The format you choose to shoot in will affect the rest of the way you work with your photos.
- Today's digital cameras, DSLR and Point and Shoot give you a choice. Most commonly these choices are RAW or JPG.
- RAW considered the digital negative, is an unprocessed file. Many of the settings in the camera are ignored when writing the file and are set later in conversion software. RAW files are loaded into a converter such as Adobe Camera RAW, Lightroom, and Capture One. Within these programs you alter your images as you see fit. Then the images are processed into a format like TIF or JPG for further editing and printing in Photoshop or Elements.
- JPG files are processed completely by the camera. Settings set in the camera are written in the file, and if acceptable could be printed right away.

There are pros and cons to both formats. A few of each are listed below.

RAW

JPG

Advantages

Non permanent editing
Greater manipulation – White Balance,
Exposure, contrast
Allows greater creativity- blending, HDR
Better end results

Smaller file size
Less or no processing needed

RAW

JPG

Disadvantages

More processing needed
Larger file size
Needs converting

Harder to edit
Smaller colour range (8-bit)
Lossy format--Changes every time saved

2.ISO

Years ago film photography used the ASA standard for rating film speeds. The different levels signified the films sensitivity to light. The new standard for both film and digital is the ISO standard. Lower ratings signify less sensitivity and higher ratings more.

What this means?

- Say for example on a sunny day you are shooting landscapes. It's a bright day, you set your ISO to 100 or 200. This will keep your images clear and crisp. Later in the evening you spot a deer almost posing for you. Because the sun is almost down there isn't enough light for you to get a proper exposure and you don't want to use any flash. Switching your camera's ISO to say 800 or even 1600 might change the camera's sensor sensitivity enough to produce an acceptable image.

The price for this?

- As we push the ISO up, what's called noise is introduced. Noise is digital's film grain. The higher the ISO the more noise that is visible, especially in darker areas of your image. Camera performance at different ISO's varies. Some are quite good at suppressing noise, others not so much. Software can help with noise, but trying to keep it to a minimum in camera, will save time and produce a better image in the end

A big advantage that we have with digital today is that we can change the ISO on a per frame basis. We're not stuck with a slow or fast ISO for a memory card like we were for a whole roll of film.

3.Exposure

Understanding the relationship between shutter speed and aperture

- Good exposure is the combination of correct shutter speed and aperture opening, for a given amount of light. The relationship between the two is that as one grows larger or faster the other grows smaller or slower. In other words, as shutter speed gets faster less light is let into the camera, so the aperture needs to be opened up to allow more light in. The reverse would happen when slowing the shutter down.
- For any given image, several combinations of correct exposure exist. Which combination you use depends on what end result you want to achieve.

Here's an Example:

You're photographing a waterfall. You meter the setup, the meter tells you to get correct exposure with a shutter speed of 1/250 sec an aperture opening of f8 is required. Maybe you want the water to be crisp in your shot, and you feel you need a faster shutter speed. To achieve the faster shutter speed you need to lower the aperture to f5.6 to compensate.

Tip: The doubling of either setting is equal to a full stop up or down. 1/125, 1/250, 1/500 are all one stop apart and f4, f8, f16 are all one stop apart.

Using shutter speed and aperture to create the images you want

- As I stated above correct exposure can be achieved with several combinations of shutter speed and aperture. Using the different combinations to match your desired result is where creativity comes into play.
- The waterfall example above showed the use of creativity. Crisp water was the desired result. Speeding up the shutter and lowering the aperture were the needed changes. Doing the opposite, slowing the shutter and opening up the aperture would have produced silky water, another creative effect.

Fast shutter speed captures action. Good for sports, fast moving water, or animals and kids that just won't sit still. Slower shutter speeds show motion. Moving water, intentional blur, or night scenes.

Depth of Field

- Depth of field is the area in front of and behind your subject that is in focus. Elements that affect this area of focus are lens aperture, distance to the subject, and the lens itself. An image 10 feet away would have a greater area of focus with an aperture of f/16 and than one with f/4. Another image 200 feet away would have more in focus than an image 20 feet away at the same aperture.
- Using Depth of Field in your image allows you to isolate your subject, blur out a busy background, or draw the viewers attention to an area you want noticed.
- Macro lenses offer a very shallow depth of field, fractions of an inch.

In Summary

The lower/wider the aperture f2.8, f4, the lower the amount of focused area
The higher the aperture the more in focus area there is.
Closer equals less, farther equals more.

4.Using Program Modes

All cameras today come with some sort of built in program modes. A few common ones are portrait, night, and sports. As well there is an automatic, shutter priority, aperture priority, and full manual mode. These are what we'll be discussing.

Automatic

- This mode takes control of all the settings in the camera. This basically turns the camera into a point- and-shoot, and is the perfect starting mode for beginners. It lets you practice your composition skills without worrying about the settings. Focusing is not part of the mode and can be set to manual or auto-focus when wanted.

Shutter Priority

- In this mode the user is in control of the shutter speed. You dial in the speed you want for the subject matter you are photographing, and the camera sets the aperture and all other settings as in automatic.

Aperture Priority

- Same as above except the user controls the aperture and the camera controls the rest.

Manual

- The user controls all aspects

5.Metering and Histograms

All DSLR's have a built in light meter these days. The meter reads the amount of light reflecting off of your subject and coming into the camera. This works great for standard photographs where the entire frame is lit fairly evenly. The meter will sample light readings from several areas showing in your view finder, average the readings out, and when set to Automatic will set your shutter and aperture accordingly. In semi-manual and full manual modes the meter displays bars showing that more or less light is required for an average exposure. You change your shutter, aperture or ISO settings to match the meter reading.

Metering Modes

Different makes of cameras offer different metering modes and have different names. Described below are relative to Nikon equipment.

- Matrix- described above
- Center weighted- Still meters the entire frame but puts greater emphasis on what's in the center
- Spot- Measures only the focus area

Challenges come when there is a significant difference of light levels in your image. A bright sun behind your subject would cause either an overexposed background or underexposed subject.

These situations can be handled by:

1. Picking the most important area of your image and exposing for it
2. Picking an exposure half way between the subject and background
3. Taking multiple exposures metering for each area (blending later)

Histogram

- Another new feature included with a lot of digital cameras is a histogram graph. Displayed on the LCD screen, this graph allows you to see the distribution of light captured by the exposure.



- A properly exposed image will have tones starting on the left edge, spread across the entire graph, and end at the right edge. Having bunches on either the left or the right edges resulting in what's called clipping, would indicate either an under(left side) or over(right side) exposed image.
- *A word of warning.* There is no real good or bad histogram. Different style images would produce histograms that look terrible, but suit the image.
- A low key or night scene would definitely have bunching on the left edge, where a high key image would bunch on the right edge. It all depends...

6.White Balance

- Light is measured in Degrees Kelvin. Light that is considered warm has a low temperature, and cold light has higher temps. Candlelight, household tungsten bulbs are warm light measured at 1000-4000 degrees. Daylight measures from 5000-6500, and cloudy skies measure 9000-10000.
- In photography we try to set our cameras to match the colour of light in our scene. With the correct setting whites are displayed accurately and no colour casts exist in our images.
- Numerous products are on the market to help us with setting the white balance. MacBeth Colorchecker, QPCards, or even an 18% gray card just to mention a few.

How do I use a color checker?

- For every new scene, you take a test shot with your model holding with one of these products. Later in your image editing software you can correct the white balance by using the eyedropper tool and clicking on the color checker.

Mixed light and White Balance

- The most common issue with setting white balance is when light of different temperatures exists in an image. Mixing natural light and a tungsten bulb would result in either an image with a blue cast when the white balance is set to tungsten or a yellow image when set for daylight. Choosing the white balance for the natural light would produce the best results. Shooting RAW, the white balance could be corrected more easily. RAW conversion programs allow broader changes to temperature shift as well as green-magenta shifts.

Tip: Look at the LCD. If your image looks too cool increase the color temperature, too warm lower it.

7.Focusing

- Most cameras today offer auto and manual focus modes. Auto focus uses a certain spot in the viewfinder as its focus point and whatever part of the subject that falls in that area is focused upon. Mid range and high-end DSLR's have multiple and selectable focus points. Starting from five like the Nikon D50 up to the fifty-one points the D300 has is possible.
- Using focus points can be relatively easy. Compose your image, with the thumb select the focus point that covers the area you want in focus and press the shutter. Not all camera modes offer this ability, so choose correctly.
- AF-Lock is a feature that allows us to hold focus in on an area we want sharp. Set your camera so that the center point is set for focusing. Focus in on the desired area, press the AF-Lock button, recompose our image and take the shot. The camera will not refocus after re-composing until the shutter has been triggered.

Tip: When doing close-up or macro photography, switch to manual focus. Many times the camera has a problem determining what you want in focus and just keeps spinning in and out.

8.Lenses

The vast selection of lenses today can be very overwhelming to a beginning photographer. There are many different types and many more different sizes and many different speeds.

Normal

- Usually around 50mm-85mm. These lenses produce an image that closely matches what the human eye sees. Very little or no distortion

Telephoto

- Lenses 85mm and above that are of fixed focal length

Zoom

- Lenses that allow a range of focal lengths in the same enclosure. Zoom lenses can fit into all other categories. A 12-24mm zoom is a wide angle lens and a 300-600mm is a telephoto.

Wide Angle

- Below 50mm, but most people don't recognize wide angles until you get around 24mm

Macro

- Lenses built for close-up images. Allows a magnification that is the same size (1:1) as the subject being photographed. Meaning that if you photograph a pencil tip close-up the image on the sensor will be exactly the same size as the real thing.

Focal Length

Without getting into a technical discussion, focal length tells us our angle of view and level of magnification. A 24mm lens will give us a wide angle of view at a short distance and a 400mm lens will give us a narrow angle with a high level of magnification at a distance.

Speed

Lenses are called slow or fast depending on their widest aperture opening. An f/2.8 lens is fairly fast and an f/5.6 would be considerably slower.