

Understanding Basic Photography

Part II

Understanding Basic Photography

- Hi - my name is John Franco
- I have been taking pictures for many years
- I am always studying and learning new ways to take better pictures
- I enjoy taking people, travel, candid and fine art pictures

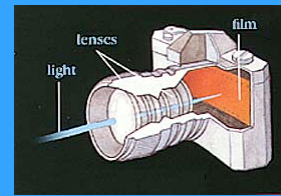
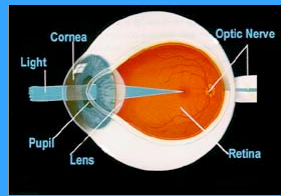
Understanding Basic Photography

- The Last time we talked about some basic photography concepts you should understand to take your photos to a whole new level.
- This time, I would like to discuss some topics on the steps that go into making a pleasing photograph

Understanding Basic Photography

- It is not a coincidence that a camera has a lot in common with the human eye
- The camera is designed to provide a physical representation of an image that the eye captures and the brain interprets and stores as a familiar object

The Human Camera



Human Eye	Camera
Shutter	1/50th, but...
Cornea	lens Hood
Iris/Pupil	Aperture
Lens	Autofocus
Retina/Rods/Cones	Sensor
Brain	Computer
Eye lid	Lens Cap

The Sensor

- The image produced by a digital camera is made up of numerous dots called pixels.
- What are Megapixels?
 - Mega - Greek for Millions
 - Pixels - Picture Elements
- A pixel is comprised of red, green, and blue (RGB) phosphor dots.
- Collectively, the number of pixels displayed is referred to as an image's resolution, and, conversely, resolution refers to the number of pixels in an entire image.
- Thus a 12 Megapixel camera has a sensor that is approximately 4000 X 3000 pixels (12,000,000)

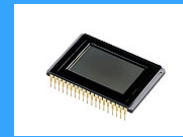
The Sensor

Let's talk about the sensor some more

- How many pixels is enough?

Resolution needed for various print sizes		
Resolution	Avg. quality	Best quality
0.5 megapixels	3x5 in.	N/A
2 megapixels	8x10 in.	3x5 in.
4 megapixels	11x14 in.	5x7 in.
6 megapixels	16x20 in.	8x10 in.
8 megapixels	20x30 in.	11x14 in.
10+ megapixels	25x40 in.	13x17 in.

Horizontal
Pixels



Digital
Sensor

Vertical
Pixels

- So, Theoretically, you can get an acceptable 8 x 10 print from a 2 megapixel camera. Why should we buy a camera with more pixels?

The Sensor

What size Sensor do I need?
The scientific answer is, of course ...

The Sensor

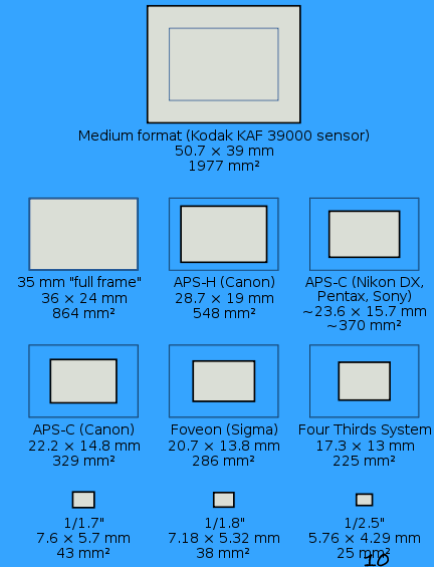
It depends

Sensor Size Comparison

❑ Sensors of digital compact cameras are substantially smaller than those of digital SLRs with a similar pixel count.

❑ As a consequence, the pixel size is substantially smaller.

❑ Because of this lower image quality of digital compact cameras suffers, especially in terms of noise and dynamic range.



Dynamic Range

- ❑ Dynamic range describes the range of tones which a sensor can capture below when a pixel becomes completely white, but yet above when texture is indiscernible from background noise (near black).
- ❑ Since larger pixels have a greater volume — and thus a greater range of photon capacity — these generally have a higher dynamic range.

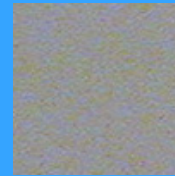
Image noise

- ❑ "Image noise" is the digital equivalent of film grain for analogue cameras.
- ❑ Alternatively, one can think of it as analogous to the subtle background hiss you may hear from your audio system at full volume.

Image noise

- ❑ For digital images, this noise appears as random speckles on an otherwise smooth surface and can significantly degrade image quality.
- ❑ Although noise often detracts from an image, it is sometimes desirable since it can add an old-fashioned, grainy look which is reminiscent of early film.
- ❑ Some noise can also increase the apparent sharpness of an image. Noise increases with the sensitivity setting in the camera, length of the exposure, temperature, and even varies amongst different camera models.

Larger Pixels
(with a Larger
Sensor)



Smaller Pixels
(with a Smaller
Sensor)

ISO/Sensitivity

- Another factor that influences image noise you should consider when taking a picture is the ISO, or sensitivity.

ISO
100



ISO
800



- When sensitivity is adjusted, it is not the amount of light but the effect of it that is adjusted.

Realistic Image Sizes

H	W	72	SENSOR SIZE	160	SENSOR SIZE	300	SENSOR SIZE
3	5	0.08	2MB	0.38	2MB	1.35	2MB
8	10	0.41	2MB	2.05	4MB	7.20	8MB
8.5	11	0.48	2MB	2.39	4MB	8.42	10MB
11	14	0.80	2MB	3.94	4MB	13.86	16MB
16	20	1.66	2MB	8.19	10MB	28.80	30MB
20	30	3.11	4MB	15.36	16MB	54.00	60MB
25	40	5.18	6MB	25.60	25MB	90.00	90MB

The following print resolutions will yield acceptable prints for most uses with little visible noise and good dynamic range at low ISO settings

72 dpi	Web Pictures
160 dpi	Family Photos
300 dpi	Fine Art Prints

Focus

- Another critical element to ~~acceptable~~ beautiful pictures is Focus
- If a picture is not in focus, the result will be a blurry photo, like this



So what affects focus?

- Most of today's cameras do a pretty good job of taking sharp, in focus pictures. That is, if you play by their rules. All cameras have their own idiosyncrasies, so you have to be careful of a few things.
- What affects focus?
 - Subject movement
 - Camera shake or movement
 - Camera focuses on wrong point in the frame
 - Slow shutter speed
 - Timing

So what affects focus?

- Focus mode - Auto focus
 - Single (or one) area focus — Camera focuses on a subject in the central area of the screen. Focus adjusts according to the distance of the subject.
 - Continuous autofocus — Focuses continually on a subject. Continuous AF can be useful, though not always perfect, when shooting slow moving subjects.
 - Spot focus — Camera focuses on a very precise center area of the screen.
 - Multi area focus — Camera automatically focuses using multiple focus points.
 - Face-priority AF controls the auto focus operation based on the location of the detected face in the scene.

So what affects focus?

- What affects focus?

- Subject movement

- If the subject is moving, like a child or a pet, then you have to be careful of a few things.

- First is shutter speed. If you have an automatic point and shoot camera, then you should set the camera to "action" or "sports" mode. The camera will then select a shutter speed it thinks is fast enough to freeze action. But it doesn't really know what is going on, it is only a guess, so take a couple of practice shots. It should also select an aperture that is stopped down (smaller) so more of the subject is in focus.

- If it is not bright out, you should choose a sensitivity or ISO that is a higher number. This will allow the camera to still set a faster shutter speed in the dim light.

So what affects focus?

- What affects focus?
 - Next is Camera shake or movement

Tips for using shutter speed in digital SLR photography

- Slow shutter speed, slows motion.
Fast shutter speed, takes the image almost instantly as if frozen in time.
- Use slow shutter speeds of at least 10 seconds or more for night shots of cities, buildings and streets etc.
- When using a slow shutter speed it's also a good idea to use a tripod and remote shutter release to avoid camera shake.
- If for any reason you don't want to use a tripod, then a general rule to avoid camera shake is to never set your shutter speed slower than the reciprocal of the focal length value. For example, if your lens focal length is set at 50mm then don't use a shutter speed any slower than 1/60th of a second and so forth.
- To photograph a running child or animal while blurring the background, set the shutter speed to between 1/40 sec and 1/125 sec. Then follow the running child or moving animal as you press the shutter button. This is often referred to as panning.

The Best Advice

□ The best advice is to always have fun taking and sharing pictures.

□ Remember -

Carpe Lumen - Seize The Light!

Contact Information

- e-mail me at john@johnrfranco.com
- my web site is www.johnrfranco.com
- join us at the Harford County
Photography Meetups
- the web site is
<http://www.meetup.com/Harford-County-Photography-Club/>