Digital Camera Basics

Auto & Fixed Focus: The better digital cameras work much like a camcorder when they focus. They send out an invisible beam (or beams) aimed at the subject you're going to take a photo of. You press the shutter button halfway down to allow them to do this, then finish pressing the button to take your photo. As a result, your photo is tailored-focuses to the subject you're aiming at.

Camera Shake: This is a term that refers to movement made by someone when they hold a camera and use the zoom. For example, if you've ever held binoculars or a telescope before, you know how when you look through how even a slight movement on your part results in a very pronounced movement on the other end? The longer the zoom, the stronger the effect. Many cameras have image stabilization, to reduce shake.

Flash: Just like in film cameras. Fires a burst of light to illuminate an area or subject for poor or indoor lit conditions. Most good digital cameras have a flash, but some of the very inexpensive beginner's models do not. Without a flash, indoor shots are nearly impossible. Many digital camera flashes are not the strongest in the world. You shouldn't expect much more than a 6 foot effective range on many of them. Turning your flash off can save a LOT of battery power.

Megapixels: Goes along with "resolution" and pixels. At the store, you'll hear the kids working there say something like, "Oh you HAVE to have this new camera, it's 8 megapixels and the latest thing!". Megapixels refers to the maximum number of pixels that will make up the largest photo size for that camera. Your camera can take photos at different resolutions, meaning that the image will have more or less pixels, and more or less quality detail.

Noise: Think of "noise" as static on an image, or as an effect very similar to film grain. Some cameras are better at reducing noise than others. Noise shows up like small specks in parts of an image such as a solid blue sky, or in solid colors in darker images. Note that most consumer level digital cameras have adjustable "iso" levels (similar to film speed - the higher the iso you pick, the more sensitive to light it is, but the higher the noise will be). So noise is pretty common in dark indoor photos.
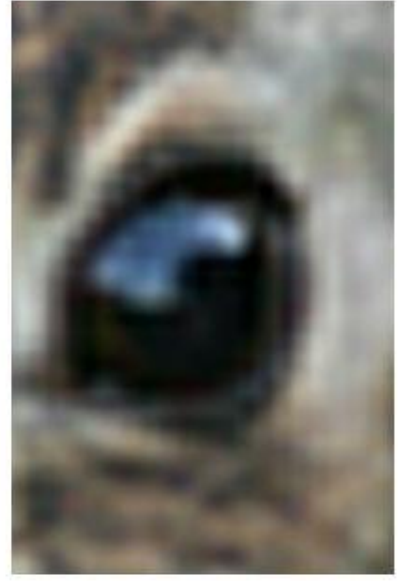
Optical vs Digital Zooms: You want to sometimes get a close image of someone or something, without having to physically move closer to the subject. Well, you must have a camera with a zoom on it in order to do so. One buzz word you'll hear, especially in cheaper cameras, is that they have a "digital zoom". Let's clear this up now... a digital zoom is not worth having, and do not allow it to steer you on your purchase. An optical zoom, is a REAL zoom, working much like a binocular or small telescope. A digital zoom simply takes the center of the photo, digitally enlarges it, and that's that.   The image quality suffers, and lacks detail, and you don't have a true zoom photo. Many cameras have an optical zoom AND a digital zoom.

Original   10x Optical   10x Digital

Macro: "Macro mode" is something you'll read in camera reviews a good bit, such as, "This camera has an excellent macro mode". Macro is simply another word that describes a camera's ability to do extreme close up shots.

JPEG, TIFF and RAW

The size of the digital file corresponding to the image which the camera produces depends on the pixel count. In most consumer digicams each pixel generates 3 bytes of data (so called "8-bit data"). One for red, one for green and one for blue. This means that a 3MP camera, which has 3 million pixels, generates 9 million bytes of data, or 9MB (megabytes). A few cameras can generate extra data for extra quality, and some of these cameras generate files which correspond to 2 bytes of data for each color   ("16-bit"), so a 3MP camera which is capable of generating 16-bit data will produce an 18MB image file.

Now these files are pretty big and they can be compressed quite a lot without a significant drop in quality. This is where JPEG (Joint Photo Experts Group) comes in. JPEG is an algorithm designed to work with continuous tone photographic images) which takes image data and compresses it in a lossy manner (this means you do lose some information). The more you compress, the smaller the file but the more information you lose. However, you can reduce file size by a factor of 10 or so and still get a very high quality image, just about as good as the uncompressed image for most purposes.

Compression": A camera must "compress" an image file in order to store it on a memory card or floppy disk, (in most cases unless you're shooting in an uncompressed TIFF mode, but that's another lesson). When it compresses an image, it takes data out of the image, to make the file size smaller. The more compression, the smaller the file

size, and the more photos that can be stored on a card or disk; however, the more an image is compressed, the worse it will look.

The smaller files take up much less storage space and are much faster to send between computers or from the digital camera or memory card to a computer.

There are also lossless ways of saving files using **TIFF** (Tagged Image File Format) . These keep all the original information, but at the cost of much bigger files. TIFF files can be compressed in a non-lossy way, but they don't get very much smaller. For example, compare the file sizes for the rabbit image above: TIFF files can also be used to save 16-bit data (those these files are twice the size of 8-bit data files), JPEG files can only save 8-bit data.

Uncompressed TIFF	Compressed TIFF	JPEG at 10:1 compression	JPEG at 40:1 compression
176.1 Kbytes	157.6 Kbytes	17.4 Kbytes	4.5 Kbytes

Some cameras offer a third option, that of saving the actual data generated by the sensor in a proprietary format. Canon calls their version of this "**RAW**", Nikon call it "**NEF**". These files are compressed, but in a non-lossy manner. They are significantly smaller than equivalent TIFF files, but larger than JPEGs. Typically they achieve a compression of around 6:1 using 16-bit data, so files are 1/6 the size of equivalent TIFF files

Image Size	TIFF (uncompressed)	JPEG (high quality)	JPEG (medium quality)
640x480	1.0 MB	300 KB	90 KB
800x600	1.5 MB	500 KB	130 KB
1024x768	2.5 MB	800 KB	200 KB
1600x1200	6.0 MB	1.7 MB	420 KB

Pixels This is what they look like, in this detail of the ear.