# Glossary of Digital Photography Terms

The following glossary is not a precise technical definition of terms, but instead is an attempt at explaining photography terms in simple layman's language.

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>35mm Equivalent (also: Crop Factor Focal Length Multiplier)</td>
<td>see Crop Factor</td>
</tr>
<tr>
<td>Anti-Blur</td>
<td>A camera mode that attempts to use a fast enough shutter speed (by upping the ISO) to prevent camera shake. Using a higher ISO usually results in higher noise in your images. Do not confuse with &quot;optical image stabilization&quot; or &quot;image sensor shift&quot; technology where either the lens or CCD image sensor is stabilized to prevent camera shake. This is known as mechanical or true image stabilization. (see Image Stabilization) A new take on this feature is the &quot;electronic&quot; blur reduction that can be performed in-camera after the picture has been taken. This uses software to basically &quot;sharpen&quot; the image so it appears sharper. Again, do not confuse with true image stabilization.</td>
</tr>
<tr>
<td>Anti-Shake (also: Image Stabilization, Vibration Reduction)</td>
<td>see Image Stabilization</td>
</tr>
</tbody>
</table>
| Aperture                  | Also referred to as f/stop, f/value, aperture value. The size the lens opens to allow in
light. A large aperture is denoted by a small number, e.g. F1.8, while a small aperture is denoted by a large number, e.g. F16. A “fast” lens is one with a large maximum aperture.

| Aperture-Priority | Select an aperture (f/stop) and the camera chooses the best shutter speed. Use this mode to control the depth of field, e.g. select a small f/stop for landscape photography to ensure maximum depth of field, and a large f/stop for portrait photography to throw everything, except the subject, out of focus. |
| Boke (pronounced BOH-KEH), and increasingly referred to in print as "Bokeh" | Japanese word meaning "fuzzy" and referring to the out-of-focus (OOF) portions of a picture. A lens is said to have "good boke" if the OOF is pleasant and does not detract from the main subject. A lens with good boke produces out of focus smooth-edged highlights and reproduces an out of focus point of light as bright in the middle and progressively getting fainter with a fuzzy edge. |
| Bulb (shutter speed) | When set to the Bulb setting, the shutter remains open as long as the shutter release button is depressed. This allows for real night photography, and is ideal for taking multiple bursts of fireworks on one frame. |
| Crop | Cropping a picture simply means to cut out a portion of the picture. For example, you may have extraneous details in your picture you do not want to display or print, so you "crop" it out. Notice, no enlargement is performed when you crop a picture. Often, you will read the term “100% crop” and all it means is that the photographer does not want to post the complete picture (could be 3MB+ in size) and so crops out the relevant part and post that as a “100% crop.” No enlargement or reduction performed. |
| Crop Factor \n(also: Focal Length Multiplier \n35mm Equivalent) | Not to be confused with "Crop" of a picture, these terms are exclusively used in the context of relating focal length to field of view (FOV), using a full-frame sensor size (24x36mm) as a reference. |

When a 35mm lens is used on a digital SLR using an image sensor that is smaller than full-frame, the smaller sensor records only a “crop” of what a full-frame sensor can, thus recording a narrower field of view. For example, an APS-sized image sensor is about half-frame and therefore has a crop factor, or focal length multiplier, of 2x (more accurately, 1.6x).

The term focal length multiplier is commonly used because, to obtain an accurate indication of the actual field of view covered, we multiply the 35mm focal length of the lens by the crop factor (focal length multiplier) to obtain a 35mm focal length equivalent. Technically, lenses made specifically for a smaller than full-frame image sensor has no crop factor. Thus, we don’t specifically speak of a crop factor for P&S cameras. However, because image sensors in P&S cameras come in many different sizes, the specified focal lengths of the lenses do not accurately represent the actual field of view recorded and cannot be directly compared one to another. They do not really make any sense until we can relate all of them to a standard reference. By using a full-frame sensor and the lenses made for them as our reference, we can then assign a “35mm Equivalent” focal length to each lens/sensor size combination to obtain an accurate indication of the field of view covered.

Using “35mm Equivalent” focal lengths, a 35mm-50mm lens is considered normal (35mm is a slight wide-angle, but pretty much the norm in today’s P&S cameras), a 28mm or less is a wide-angle, a 100mm-200mm is a medium telephoto, a 300mm-400mm (and longer) is a long telephoto.
<table>
<thead>
<tr>
<th><strong>Depth of Field (DOF)</strong></th>
<th>The distance wherein objects are in focus. The smaller the aperture, the greater the depth of field achieved. [more...]</th>
</tr>
</thead>
</table>
| **Depth of Field Preview Button** | A button (usually found around the lens mount) on a DSLR that, when pushed in, closes the lens to the metered aperture (“stops down the lens”) to allow you to check the DOF.  

DSLRs with APS-sized sensors usually have viewfinders that are smaller than on DSLRs using a full-frame sensor. The smaller viewfinder often makes it very difficult to judge DOF when the lens is stopped down.  

And, since the aperture selected might sometimes be small and so return a dark view which might make it even more difficult to ascertain the DOF, some photographers prefer to take the shot and review the DOF on the big and clear LCD of their DSLR. |
| **Exposure (Control)** | The different modes the camera provides for controlling exposure, e.g. Auto, Manual, Shutter Priority, Aperture Priority. See also: Shooting Modes. |
| **Focal Length Multiplier** | see Crop Factor  

(also: Crop Factor 35mm Equivalent) |
| **Image Sensor** | The image sensor is the equivalent of 'film'.  

An image sensor contains millions of pixels (megapixels) arranged in a matrix whose job is to catch and record light when you take a picture. Each pixel registers the brightness -- or, intensity -- of the light falling on it. By using colored filters and an array of small lenses, the image sensor is able to record color values in a small footprint.  

A high resolution image sensor can capture much more variation in light than a low resolution image sensor, and can therefore reproduce an image more faithfully and realistically.  

The size of an image sensor also contributes to the quality of the images captured. In general, the larger the image sensor, the less noise in the images.  

Cramming ever more megapixels onto a small image sensor tends to reduce the image quality, especially introducing more noise. The sweet spot seems to be 7MP on a 1/1.8-in. image sensor. |
| **Image Stabilization** | A technology that stabilizes either the lens ("optical image stabilization") or image sensor ("image sensor shift" or "CCD-shift") to effectively reduce blur due to camera shake when using a slow shutter speed.  

This allows the hand-holding of a camera at slower shutter speed (without upping the ISO).  

Do not confuse with "Anti-Blur," "Digital Image Stabilization," "Picture..." |
Stabilization,” or “electronic Vibration Reduction” where the camera either selects a higher ISO to allow the use of a fast enough shutter speed to counter the effect of camera shake or uses in-camera processing to “sharpen” the image.

Optical Image Stabilization and Image Sensor (or CCD) Shift Image Stabilization are also known as mechanical or true image stabilization.

| ISO | In photography, an ISO number is an indication of the sensitivity of the image sensor, where a higher number indicates higher sensitivity. This is usually expressed as a range, e.g. ISO 100 - 1600. A higher sensitivity allows us to take pictures in low light without using flash. However, this gain usually comes at a price: as we amplify the light signal, we also amplify the noise signal, and high ISO images are usually more “noisy” than low ISO images. Noise reduction software can smooth out the noise but it comes at the expense of losing fine detail. Larger image sensors have larger pixels with better light signal to noise ratio, and produce “cleaner” high ISO images. Derived from the Greek isos, meaning “equal”. 

International Organization for Standardization chose this short all-purpose name instead of using its acronym "IOS" so that whatever the country and language, the short form of the organization’s name is always "ISO" (pronounced “eye-so”). However, if you find others pronouncing it as "eye-s-oh" (as I do), leave us alone -- please don’t make it into a fight :o). |
| Light Metering | How the camera measures the amount of light available to expose a picture.

Centre-Weighted: Readings are taken at various part of the picture, with a special emphasis for the centre.

Spot: Readings are taken at a specific point.

Besides the above two light metering options, each camera manufacturer has its own variations, such as Matrix Metering, Multi-Pattern Metering, etc. |
| Macro Photography | Photographing small objects, by usually moving close up. A steady tripod and a macro ring light ensure well exposed pictures. |
| Megapixels, effective | Millions of pixels (usually used in reference to the resolution of an image sensor). |
A digital camera can have an image sensor that is rated 4.2 megapixels but delivers an effective resolution of 4.0 megapixels. The higher the effective resolution, the higher the quality of the picture that can be recorded (providing the lens is able to produce the quality image in the first place).

Some digital cameras might advertise the "interpolated" pixels. As an example, Fujifilm's Super CCD image sensor can capture "effective" pixels of 3.1 megapixels, then its software kicks in and interpolates them up to 6 megapixels. Do bear in mind a digital camera that outputs 6 interpolated megapixels will never deliver the same quality that a real 6 effective megapixels digital camera will, and should still be compared to a 3 effective megapixels digital camera.

What is important when comparing resolution of different image sensors in digital cameras is the effective megapixels.

<table>
<thead>
<tr>
<th>OEM</th>
<th>Original Equipment Manufacturer.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>While this is not technically a digital photography term, you may have come across it when reading about how many of the major digital camera companies do not actually make the cameras bearing their brands, and wondered if one brand was any different from another.</td>
</tr>
<tr>
<td></td>
<td>The question is sometimes yes and sometimes no.</td>
</tr>
<tr>
<td></td>
<td>The OEMs outsource the manufacture to low-cost third party manufacturers and then rebrand the cameras, sometimes adding value in the form of better lenses and firmware, and sometimes not.</td>
</tr>
<tr>
<td></td>
<td>Now you know why some of these digital cameras have very similar feature set and why many even look similar, minus some cosmetic changes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oily Nose Syndrome</th>
<th>Where oil from your nose smears the LCD.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Some digital cameras have viewfinders that are so flushed with the body that when you bring the camera up to your eye, you end up smearing nose oil all over the LCD.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ND Filter</th>
<th>When you use a Neutral Density (ND) filter on your lens, it allows you to optically cut out the amount of light going through the lens, but otherwise does not ideally affect image quality.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Of course, the quality of the glass used matters. It is also sometimes possible to stack one ND filter on top of another to vary the amount of light you want to reduce.</td>
</tr>
<tr>
<td></td>
<td>Usually used on bright sunny days to cut down on the amount of light and thus allowing the photographer to use a slow shutter speed for recording effects depicting motion (e.g. &quot;water as a cloud&quot;).</td>
</tr>
</tbody>
</table>
### Noise
When a slow shutter speed is used (1/30 sec. and lower), the image degrades due to the buildup of electronic signal ("noise"). Software in the digital camera automatically compensates to reduce that noise. Most digital cameras have noise reduction that automatically kicks in at slow shutter speeds.

Similarly, when a high ISO is used, noise starts to show in images. For now, most consumer digital cameras are not good at high ISOs, even though the camera might offer them.

Noise exhibits itself as luminance and chrominance noise. Luminance noise is the digital equivalent of film grain, and appears as brightness variations. Chrominance noise (or color noise) appears as colored splotches.

*see What Is... Noise?*

### Photoshop
An image editing software. The most popular.

### Photoxels
Digital Photography is a marriage of traditional photography (you still gotta develop an eye for what makes a good picture) and digital pixels, hence:

\[
\text{Digital Photography} = \text{Photography} + \text{Digital Pixels} = \text{Photoxels.}
\]

### Pixel
Picture element.

### Pre-focusing
A technique to allow you to focus on a subject that is not at the center of the screen. By default a camera will focus at the center of the screen. By pressing the shutter release button half-way you can lock focus on your off-center subject, then recompose and depress the shutter release fully to take the shot.

Pre-focusing also helps to eliminate shutter lag that is mostly due to the time the camera takes to lock focus.

### Resolution, Sensor
For our purpose, let’s just define this as the number of pixels used to capture an image. In reality, excellent *image* resolution is achieved by a combination of pixel count (image sensor resolution) and lens resolution.

If the image sensor resolution is expressed as numbers such as 2048x1536, just multiply them out and divide by 1 million to get the resolution in megapixels. In this case, we get 3+ megapixels.

Usually the higher the image sensor resolution, the better the image quality.

### Shooting Modes
The amount of control you have in choosing how your digital camera captures an image.
<table>
<thead>
<tr>
<th>All digital cameras usually have an Auto mode: the camera decides for you the best shutter speed/aperture settings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutter Priority: Allows you to decide the shutter speed (e.g. fast at 1/500 sec. for stop action photography, or slow at 2 sec. for night photography), and the camera decides the best aperture.</td>
</tr>
<tr>
<td>Aperture Priority: Allows you to choose the aperture (e.g. large at F1.8 for portrait, of small at F16 for landscapes).</td>
</tr>
<tr>
<td>Manual: You have complete creative control in selecting both the shutter and aperture.</td>
</tr>
<tr>
<td>Scene Modes: Pre-set exposure control (shutter/aperture combination, plus other adjustments, such as white balance, exposure compensation, etc.) for various common picture situations, such as Night Scene, Portrait, Landscape, Action, etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shutter Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>The time elapsed between pressing the shutter release button and the camera actually taking the picture.</td>
</tr>
<tr>
<td>A short shutter lag (around 1/2 sec. or less) is desirable since it allows you to take candid shots.</td>
</tr>
<tr>
<td>A long shutter lag (around 1 sec. or more) means that you will find it difficult to capture the picture at the exact moment you desire (since the camera takes it one second or more after you depressed the shutter).</td>
</tr>
<tr>
<td>Using the pre-focusing technique can help eliminate shutter lag that is due to the relatively long time that some digital cameras takes to lock focus.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shutter-Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select the shutter speed and the camera chooses the best aperture. Use this mode to freeze fast moving action or emphasize motion. For example, select a fast shutter speed (e.g. 1/1,000 sec.) to freeze a cyclist zooming by. Or, select a slow shutter speed (e.g. 1/30 sec.) to capture the cyclist as a blur to emphasize the speed of the motion.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>The length of time the shutter blades stay open to allow light into the camera. The longer the shutter stays open (e.g. 1/30 sec.), the more light; the shorter the shutter stays open (e.g. 1/1,000 sec.), the less light. Snapshots and action photography usually requires a fast shutter speed to freeze action; landscapes usually require a small aperture for maximum depth of field, and hence a longer shutter speed for properly exposed pictures.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>The digital medium that replaces film. A number of competing storage media cards are offered, with the most common ones being CompactFlash (CF) and SecureDigital (SD). [Sony uses its own proprietary Memory Stick, Olympus has its proprietary xD-Picture Card.]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vibration Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(also: Anti-Shake Image Stabilization)</strong></td>
</tr>
<tr>
<td>See Image Stabilization</td>
</tr>
<tr>
<td>(Do not confuse with electronic Vibration Reduction that uses in-camera processing to sharpen the image)</td>
</tr>
<tr>
<td>White balance</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>White balance refers to the ability to adjust colors based on white as a reference color to give as true a white as possible; in the process, all the other colors are also corrected.</td>
</tr>
<tr>
<td>Auto WB (AWB): the camera determines and selects the correct color temperature for white.</td>
</tr>
<tr>
<td>Some preset white balance settings are daylight, cloudy, tungsten, or fluorescent. Using white balance properly is essential in digital photography.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zoom, Optical vs. Digital vs. Total</th>
<th>Whereas an optical zoom uses the optics (lens) of the digital camera to move you closer to your subject, a digital zoom simply uses the existing image and enlarges it digitally.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enlarging the image digitally reduces picture quality, and should therefore usually be avoided. However, a judicious use of digital zoom may sometimes yield images that are of quite acceptable quality. So, use with caution.</td>
<td></td>
</tr>
<tr>
<td>Some manufacturers label their lenses with the &quot;total zoom&quot; by multiplying the optical with the digital. Ignore total zoom claims because you can use any multiplier digital zoom you want in an image editing software.</td>
<td></td>
</tr>
<tr>
<td>What is important when comparing digital cameras is the optical zoom. Digital zoom can always be achieved later in an image editing software, such as Photoshop, so should not really be a determining factor when choosing a digital camera.</td>
<td></td>
</tr>
<tr>
<td>see Optical vs. Digital Zoom</td>
<td></td>
</tr>
</tbody>
</table>