

Understanding Your Digital Camera



Author: Gary Fitzgerald

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Table of Contents

TABLE OF CONTENTS	3
AIMS OF THIS TEXT	4
STATING THE OBVIOUS.....	4
DIGITAL CAMERAS	5
7 TIPS FOR SHOOTING GREAT DIGITAL PHOTOS	5
1. <i>Know Your Camera</i>	5
2. <i>Learn to Control the Flash</i>	5
3. <i>Play with the Macro Mode</i>	5
4. <i>Hold the Camera Level</i>	6
5. <i>Use the Tripod</i>	6
6. <i>Play with the ISO Setting</i>	6
7. <i>Have Enough Memory Capacity</i>	6
<i>Conclusion</i>	6
YOUR CAMERA	7
<i>Shutter Speed and Aperture work hand-in-hand</i>	8
Shutter Speed	8
Aperture.....	8
Balancing Shutter and Aperture.....	8
Take a stop, Give a stop... ..	9
<i>What is Depth of Field?</i>	9
<i>Standard Symbols</i>	10
<i>Rule of Thirds</i>	12
What is the Rule of Thirds?	12
DIGITAL PHOTOGRAPHY GLOSSARY	14
OTHER WEB SITES YOU CAN GO TO FOR MORE TERMS	18
YOUR NOTES	19

Aims of this Text

This text is aimed at people who:

- Wish to learn about some basic functions of their compact Digital Camera
- Obtain basic skill and understanding in the use of a Digital Camera
- Apply a range of effects to an image

Stating the Obvious

This text will talk about specifics of some Cameras and Software used and it is important to remember that not all Cameras are the same and therefore you will need to adapt the information to suit your particular circumstances.

Digital Cameras

7 Tips for Shooting Great Digital Photos ¹

A shot of some beautiful flowers.

So how do you begin to take good photos? Well, the first thing to remember is this: It's the photographer that takes great photos, not the camera. Think about that for a minute. It's true isn't it? I've seen some people take great photos with a simple point-and-shoot camera, while some take lousy shots with the most expensive SLR.

Fret not! Read these tips on shooting digital photos and apply them the next time you have a chance. Before long, you'll be shooting photos like a pro!



1. Know Your Camera

Does this sound familiar? You buy the latest digital camera out there, come home, rip off the box then proceed to fiddle with the device. You briefly flick through the hundred page camera manual and then never look at it again. Not a good idea! If you buy a digital camera, you owe it to yourself to understand its ins and outs. Learn how to control exposure, how to use different camera modes and how to use the flash. The knowledge you gain about the camera will be invaluable when you're out in the field taking those special photos.

2. Learn to Control the Flash

One of the most important things you need to know about digital photography is to control the flash. Personally, I hate to rely on the automatic flash that comes with the digital camera. Depending on the situation, you need to switch off or switch on the flash.

For example, when taking outdoor photos, it is sometimes good to turn on the flash to illuminate the subject, especially if he or she is in the shade. On the other hand, you can also choose to turn off the flash when taking indoor shots. Sometimes, using the flash indoors will result in unnatural skin colour and harsh glare in your photos.

3. Play with the Macro Mode

Almost all digital cameras these days have a macro mode. This setting is ideal for taking close up shots of objects like flowers or insects. On my Canon PowerShot S500, it's represented by a flower symbol. What you do is to pick a subject, turn on macro mode, then get as close to it as your camera will allow. Make sure you allow the camera to focus properly before depressing the shutter button fully.

¹ Basic-Digital-Photography.com, 2006, Basic Digital Photography, <http://www.basic-digital-photography.com/shooting-photos.html>

4. Hold the Camera Level

A basic rule of photography is to hold the camera level. Since most digital cameras come with a LCD, you can use it to properly frame your shots. Next time you're taking a shot, try to look for the horizontal lines and use them as guides. A good example is to make use of the horizon when you're taking a photo of a sunset.

5. Use the Tripod

I recommend this tip to all budding photographers - camera tripods are an essential tool in your photography arsenal. When will you need a tripod? Well, it's useful if you're taking shots under low-light conditions or trying to capture fast moving objects. I like to use a tripod when taking night shots city streets, for example. Always try to look for a tripod that's convenient to carry around. For personal use, you don't need a huge one - just a simple compact one that's easy to pack.

6. Play with the ISO Setting

I find the ISO setting in digital cameras very useful. The ISO setting of a essentially camera controls its sensitivity to light. If you're taking a photo of a still object, like a flower, then always use a low ISO setting. It allows for a longer shutter speed and produces a cleaner image. If you're shooting a moving object, like a baby playing with a toy, then a higher ISO setting of say 400 would be better. Do take note, however, that a higher ISO setting gives a faster shutter speed and requires less light. This will produce noisier photos.

7. Have Enough Memory Capacity

Just like you must have enough rolls of film when using traditional cameras, make sure you always have enough memory capacity in your digital camera. It's terrible to be on a holiday taking great photos and suddenly realizing you've no memory space left. Here are some general guidelines for digital camera storage.

- 2 megapixel cameras - get at least a 64MB card
- 3 megapixel camera - get at least a 128MB card
- 4 megapixel camera - get at least a 256MB card
- 5 megapixel camera and above - get at least a 1GB card
- 8 megapixel camera and above - get at least a 2GB card
- 10 megapixel camera and above - get at least a 4GB card or above
- There are many Cameras today that will exceed these measurements, the larger the megapixel the larger the memory card needs to be.

Conclusion

Whew, a pretty long article. I hope I've managed to give you some good tips on shooting great digital photos. Always remember what I said - while the latest and greatest digital cameras have amazing features, you still need a skilled photographer to take nice pictures. Apply the above tips to your everyday shooting and learn to be a better photographer.

Your Camera

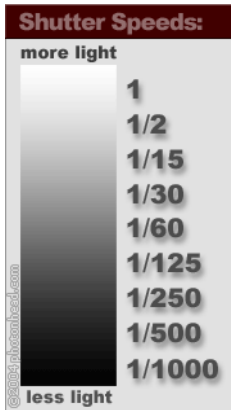
There a range of things that your Camera can do and it is beyond the scope of this text to explain them all. And if we were all honest with each other you really don't want to know.

However there are some important aspects that you should be aware of. Use this grid to identify some options and record the page numbers in your Manual that will assist.

Batteries	Your battery type is very important and you should have at least one spare battery and a recharging kit.																																																																												
Memory Card	Most use an SD Memory Card, up to 8Gb. Nearly all new laptops have an SD slot.																																																																												
Video & Sound	Capable of recording video and sound																																																																												
Recording an Image Memo	Capable of recording a voice memo for each picture																																																																												
USB	Most common method for connecting to other devices																																																																												
Menu	Provides numerous options to operate																																																																												
Focus Area	Can be changed from wide view to a central position																																																																												
Flash	Auto or Manual																																																																												
Capture Date/Time	Print date and time on images																																																																												
Image Quality	<p>Save images either for quality or space</p> <p>● Appropriate Number of Recorded Pixels According to Use</p> <table border="1"> <thead> <tr> <th>Recorded Pixels</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td>6M 2816×2112</td> <td rowspan="2">For printing high quality photos or A4-size pictures, or editing images on a PC.</td> </tr> <tr> <td>5M 2560×1920</td> </tr> <tr> <td>4M 2304×1728</td> <td rowspan="2">For making postcard-size prints.</td> </tr> <tr> <td>3M 2048×1536</td> </tr> <tr> <td>2M 1600×1200</td> <td rowspan="2">For posting on a website or attaching to e-mail.</td> </tr> <tr> <td>1024 1024× 768</td> </tr> <tr> <td>640 640× 480</td> <td></td> </tr> </tbody> </table> <p>The default setting is 6M (2816×2112).</p> <p>● Recorded Pixels, Quality Level and Image Storage Capacity (Approximate numbers of pictures)</p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">★★★ (Best)</th> <th colspan="2">★★ (Better)</th> <th colspan="2">★ (Good)</th> </tr> <tr> <th>Built-in Memory</th> <th>128MB</th> <th>Built-in Memory</th> <th>128MB</th> <th>Built-in Memory</th> <th>128MB</th> </tr> </thead> <tbody> <tr> <td>6M 2816×2112</td> <td>7</td> <td>41</td> <td>14</td> <td>83</td> <td>22</td> <td>124</td> </tr> <tr> <td>5M 2560×1920</td> <td>8</td> <td>49</td> <td>17</td> <td>95</td> <td>24</td> <td>137</td> </tr> <tr> <td>4M 2304×1728</td> <td>11</td> <td>62</td> <td>22</td> <td>124</td> <td>31</td> <td>178</td> </tr> <tr> <td>3M 2048×1536</td> <td>13</td> <td>77</td> <td>27</td> <td>153</td> <td>40</td> <td>223</td> </tr> <tr> <td>2M 1600×1200</td> <td>22</td> <td>124</td> <td>37</td> <td>206</td> <td>54</td> <td>301</td> </tr> <tr> <td>1024 1024× 768</td> <td>43</td> <td>244</td> <td>74</td> <td>412</td> <td>93</td> <td>522</td> </tr> <tr> <td>640 640× 480</td> <td>87</td> <td>489</td> <td>127</td> <td>712</td> <td>175</td> <td>979</td> </tr> </tbody> </table> <p>• The above figures may vary depending on the subject, shooting conditions, shooting mode and SD Memory Card, etc.</p>	Recorded Pixels	Use	6M 2816×2112	For printing high quality photos or A4-size pictures, or editing images on a PC.	5M 2560×1920	4M 2304×1728	For making postcard-size prints.	3M 2048×1536	2M 1600×1200	For posting on a website or attaching to e-mail.	1024 1024× 768	640 640× 480			★★★ (Best)		★★ (Better)		★ (Good)		Built-in Memory	128MB	Built-in Memory	128MB	Built-in Memory	128MB	6M 2816×2112	7	41	14	83	22	124	5M 2560×1920	8	49	17	95	24	137	4M 2304×1728	11	62	22	124	31	178	3M 2048×1536	13	77	27	153	40	223	2M 1600×1200	22	124	37	206	54	301	1024 1024× 768	43	244	74	412	93	522	640 640× 480	87	489	127	712	175	979	<p>Therefore with a 4Gb SD card the number of pictures could range from:</p> <p>Largest – Best = 656 images Good = 1,984 images</p> <p>Smallest – Best = 7,824 images Good = 15,664 images</p>
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Shutter Speed	Controls light																																																																												
Aperture	Controls light																																																																												
Macro	Extreme Close up, requires a steady hand (preferably a tripod stand)																																																																												
Zoom	A variety of close-up options																																																																												

Shutter Speed and Aperture work hand-in-hand ²

Shutter Speed



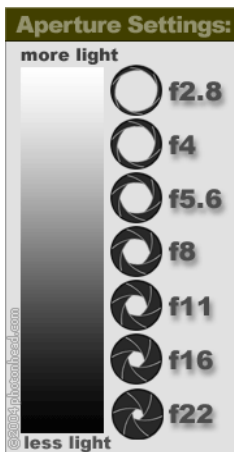
Longer speed - more light
Shorter speed - less light:

From 1/1000th of a second to 1 second

The faster the speed, the more light that is required

In the old film days you had to purchase the respective film for the shutter speed, to make allowances for less light

Aperture



Aperture Settings (F-Stops):

Like the pupil in a human eye, the aperture on a camera controls light. It does so by closing up to restrict light and opening up to let it through.

Examples:

*moving from f16 to f8 is:
TWO STOPS brighter.*

*moving from f5.6 to f8 is:
ONE STOP darker*

moving from f4 to f2.8 is: ONE STOP brighter

Balancing Shutter and Aperture



Exposure is about different combinations of shutter and f-stop settings. These combinations can drastically affect the finished picture. For example, the three pictures opposite have been given an equal amount of light, but the f-stop and shutter combinations make each one unique.

² Photonhead web site, Sep 20 2009, Beginners guide to photography, Shutter and Aperture, <http://www.photonhead.com/beginners/shutterandaperture.php>

Why is the background all blurred in the right picture, and sharpest in the left? Because if the exposure is made with a wide aperture (like f2.8), then objects farther away from the subject are thrown farther out of focus. This effect is referred to as "depth of field".

So: if the aperture is small (like f22) then objects in the background (and foreground) will appear sharper. However, since more light was required to make the exposure on the left (1/4 Second) the subjects became blurred from MOTION. At 1/250th of a second, the shutter is fast enough to freeze motion.

Take a stop, Give a stop...

Since f-stop and shutter are both measured in stops, keeping balance is easy. If you take away 2 stops from the aperture, you can give 2 stops back with the shutter and end up with the same exposure level.

What is Depth of Field? ³

As a concept, depth-of-field is poorly understood by many beginning and amateur photographers. One of the primary benefits of owning a DSLR camera is the control the photographer gains over the relative depth-of-field (what appears to be in sharpest focus)



for any given shot. In contrast, digital point and shoot cameras utilize sensors so small, with correspondingly short focal length lenses, that there is very little opportunity to exercise any depth of field control because literally everything appears to be in sharp focus.

Even for those more experienced photographers who do understand the relationships between aperture size, lens focal length and subject distance, calculating the best aperture to achieve a desired result often amounts to little more than guesswork, and frequently results in overcompensation and wasted shutter speed.



These effects could be achieved by using software on your PC to enhance your image.

³ Expolmaging web site, Sep 20 2009, ExpoAperture2 Depth-of-Field Guide, <http://www.expolmaging.net>

Standard Symbols

Whilst all cameras are designed differently many of the same features are found and it is just a matter of recognising them on your camera.

The following symbols are a guide only:



Turns on and off camera's monitor



Take still photos



For recording under overcast, twilight or shady conditions



Macro - Automatically sets the camera for objects near the lens



Sets timed shutter release so you can be in the picture. Time varies from camera to camera. This setting reduces the effects of you pushing the shutter release in extreme low light settings



Shows the pictures stored in the camera



Allows you to shoot successive images while the shutter button is pressed fully



Remove unwanted images



Connecting site for your camera to the computer



Switch to turn the camera off and on



Movie mode



In this mode you can take pictures of individual or small groups



In this mode you can take pictures of mountains, prairies or any large scene



Take photos of moving objects



Take photos at night or with little light



Camera decides flash settings



Flash will fire regardless



Turns off the flash



Reduce red-eye. A series of small flash before photo is taken



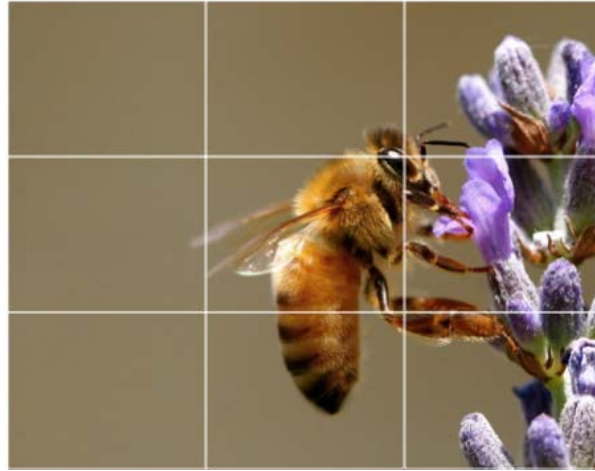
Battery life indicator

Rule of Thirds

Perhaps the most well know principle of photographic composition is the ‘Rule of Thirds’.

The “Rule of Thirds” one of the first things that budding digital photographers learn about in classes on photography and rightly so as it is the basis for well balanced and interesting shots.

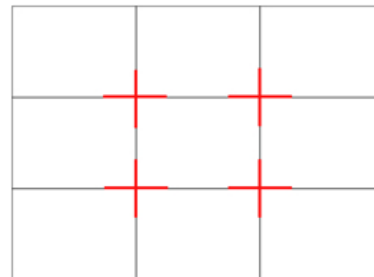
I will say right up front however that rules are meant to be broken and ignoring this one doesn’t mean your images are necessarily unbalanced or uninteresting. However a wise person once told me that if you intend to break a rule you should always learn it first to make sure your breaking of it is all the more effective!



What is the Rule of Thirds?

The basic principle behind the rule of thirds is to imagine breaking an image down into thirds (both horizontally and vertically) so that you have 9 parts. As opposite:

As you’re taking an image you would have done this in your mind through your viewfinder or in the LCD display that you use to frame your shot.



With this grid in mind the ‘rule of thirds’ now identifies four important parts of the image that you should consider placing points of interest in as you frame your image.

Not only this – but it also gives you four ‘lines’ that are also useful positions for elements in your photo. Some cameras have a setting to display this grid.

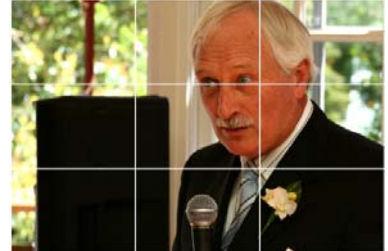
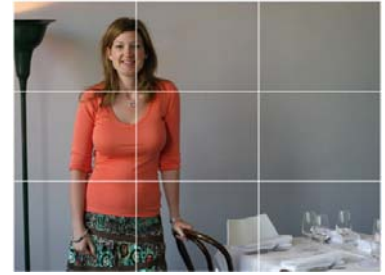
The theory is that if you place points of interest in the intersections or along the lines that your photo becomes more balanced and will enable a viewer of the image to interact with it more naturally. Studies have shown that when viewing images that people’s eyes usually go to one of the intersection points most naturally rather than the centre of the shot – using the rule of thirds works with this natural way of viewing an image rather than working against it.

In addition to the above picture of the bee where the bee's eye becomes the point of focus here are a couple of examples:

Using the Rule of Thirds comes naturally to some photographers but for many of us takes a little time and practice for it to become second nature.

In learning how to use the rule of thirds (and then to break it) the most important questions to be asking of yourself are:

- What are the points of interest in this shot?
- Where am I intentionally placing them?



Once again – remember that breaking the rule can result in some striking shots – so once you've learnt it experiment with purposely breaking it to see what you discover.

Digital Photography Glossary ⁴

Ambient light	The natural light in a scene.
Archival	The ability of a material, including some printing papers and compact discs, to last for many years.
Aperture	A small, circular opening inside the lens that can change in diameter to control the amount of light reaching the camera's sensor as a picture is taken. The aperture diameter is expressed in f-stops; the lower the number, the larger the aperture. For instance, the aperture opening when set to f/2.8 is larger than at f/8. The aperture and shutter speed together control the total amount of light reaching the sensor. A larger aperture passes more light through to the sensor. Many cameras have an aperture priority mode that allows you to adjust the aperture to your own liking. See also <i>shutter speed</i> .
Application	A computer program, such as an image editor or image browser.
Buffer	Memory in the camera that stores digital photos before they are written to the memory card.
CCD	Charge Coupled Device: one of the two main types of image sensors used in digital cameras. When a picture is taken, the CCD is struck by light coming through the camera's lens. Each of the thousands or millions of tiny pixels that make up the CCD convert this light into electrons. The number of electrons, usually described as the pixel's accumulated charge, is measured, and then converted to a digital value. This last step occurs outside the CCD, in a camera component called an analog-to-digital converter.
CMOS	Complementary Metal-Oxide Semiconductor: one of the two main types of image sensors used in digital cameras. Its basic function is the same as that of a CCD. CMOS sensors are currently found in only a handful of digital cameras.
CMYK	Cyan, Magenta, Yellow, Black. The four colours in the inksets of many photo-quality printers. Some printers use six ink colours to achieve smoother, more photographic prints. The two additional colours are often lighter shades of cyan and magenta.
Contrast	The difference between the darkest and lightest areas in a photo. The greater the difference, the higher the contrast.

⁴ Microsoft, April 16 2008, Digital Photography Glossary, <http://www.microsoft.com/windowsxp/using/digitalphotography/glossary/default.mspx>

Digital camera	A camera that captures the photo not on film, but in an electronic imaging sensor that takes the place of film.
Dodging	Selectively lightening part of a photo with an image editing program.
Download, downloading	The process of moving computer data from one location to another. Though the term is normally used to describe the transfer, or downloading, of data from the Internet, it is also used to describe the transfer of photos from a camera memory card to the computer. <i>Example: I downloaded photos to my PC.</i>
DPI	Dots per inch: A measurement of the resolution of a digital photo or digital device, including digital cameras and printers. The higher the number, the greater the resolution.
EXIF	Exchangeable Image File: the file format used by most digital cameras. For example, when a typical camera is set to record a JPEG, it's actually recording an EXIF file that uses JPEG compression to compress the photo data within the file.
External flash	A supplementary flash unit that connects to the camera with a cable, or is triggered by the light from the camera's internal flash. Many fun and creative effects can be created with external flash.
File	A computer document/file.
Fill flash	A flash technique used to brighten deep shadow areas, typically outdoors on sunny days. Some digital cameras include a fill flash mode that forces the flash to fire, even in bright light.
Fire	Slang for shooting a picture. <i>Example: I pressed the shutter button to fire.</i>
FireWire	A type of cabling technology for transferring data to and from digital devices at high speed. Some professional digital cameras and memory card readers connect to the computer over FireWire. FireWire card readers are typically faster than those that connect via USB. Also known as IEEE 1394, FireWire was invented by Apple Computer but is now commonly used with Windows-based PCs as well.
Greyscale	A photo made up of varying tones of black and white. Greyscale is synonymous with black and white.
Highlights	The brightest parts of a photo.
Histogram	A graphic representation of the range of tones from dark to light in a photo. Some digital cameras include a histogram feature that enables a precise check on the exposure of the photo.
Image browser	An application that enables you to view digital photos. Some browsers also allow you to rename files, convert photos from one

	<p>file format to another, add text descriptions, and more.</p>
Image editor	<p>A computer program that enables you to adjust a photo to improve its appearance. With image editing software, you can darken or lighten a photo, rotate it, adjust its contrast, crop out extraneous detail, remove red-eye and more.</p>
Image resolution	<p>The number of pixels in a digital photo is commonly referred to as its image resolution.</p>
Inkjet	<p>A printer that places ink on the paper by spraying droplets through tiny nozzles.</p>
ISO speed	<p>A rating of a film's sensitivity to light. Though digital cameras don't use film, they have adopted the same rating system for describing the sensitivity of the camera's imaging sensor. Digital cameras often include a control for adjusting the ISO speed; some will adjust it automatically depending on the lighting conditions, adjusting it upwards as the available light dims. Generally, as ISO speed climbs, image quality drops.</p>
JPEG	<p>A standard for compressing image data developed by the Joint Photographic Experts Group, hence the name JPEG. Strictly speaking, JPEG is not a file format, it's a compression method that is used within a file format, such as the EXIF-JPEG format common to digital cameras. It is referred to as a lossy format, which means some quality is lost in achieving JPEG's high compression rates. Usually, if a high-quality, low-compression JPEG setting is chosen on a digital camera, the loss of quality is not detectable to the eye.</p>
LCD	<p>Liquid Crystal Display: a low-power monitor often used on the top and/or rear of a digital camera to display settings or the photo itself.</p>
Media	<p>Material that information is written to and stored on. Digital photography storage media includes CompactFlash cards and CDs.</p>
Megabyte (MB)	<p>A measurement of data storage equal to 1024 kilobytes (KB).</p>
Megapixel	<p>Equal to one million pixels.</p>
Memory Stick®	<p>A memory card slightly smaller than a single stick of chewing gum. Like CompactFlash and SmartMedia, it is flash-based storage for your photos.</p>
NiMH	<p>Nickel Metal-Hydride: a type of rechargeable battery that can be recharged many times. NiMH batteries provide sufficient power to run digital cameras and flashes.</p>

Online photo printer	A company that receives digital photos uploaded to its Web site, prints them, then sends the prints back by mail or courier.
Panning	A photography technique in which the camera follows a moving subject. Done correctly, the subject is sharp and clear, while the background is blurred, giving a sense of motion to the photo.
Pixel	Picture Element: digital photographs are comprised of thousands or millions of them; they are the building blocks of a digital photo.
RAW	The RAW image format is the data as it comes directly off the CCD, with no in-camera processing is performed.
Red-eye	The red glow from a subject's eyes caused by light from a flash reflecting off the blood vessels behind the retina in the eye. The effect is most common when light levels are low, outdoor at night, or indoor in a dimly-lit room.
RGB	Red, Green, Blue: the three colours to which the human visual system, digital cameras and many other devices are sensitive.
Saturation	How rich the colours are in a photo.
Sensitivity	See <i>ISO speed</i> .
Serial	A method for connecting an external device such as a printer, scanner, or camera, to a computer. It has been all but replaced by USB and FireWire in modern computers.
Sharpness	The clarity of detail in a photo.
Shutter speed	The camera's shutter speed is a measurement of how long its shutter remains open as the picture is taken. The slower the shutter speed, the longer the exposure time. When the shutter speed is set to 1/125 or simply 125, this means that the shutter will be open for exactly 1/125th of one second. The shutter speed and aperture together control the total amount of light reaching the sensor. Some digital cameras have a shutter priority mode that allows you to set the shutter speed to your liking. See also <i>aperture</i> .
SmartMedia™	A wafer-thin, matchbook size memory card. This is also a flash-memory based storage medium.
Thumbnail	A small version of a photo. Image browsers commonly display thumbnails of photos several or even dozens at a time. In Windows XP's My Pictures, you can view thumbnails of photos in both the Thumbnails and Filmstrip view modes.
USB	Universal Serial Bus: a protocol for transferring data to and from digital devices. Many digital cameras and memory card readers

	<ul style="list-style-type: none">connect to the USB port on a computer. USB card readers are typically faster than cameras or readers that connect to the serial port, but slower than those that connect via FireWire.
White balance	<ul style="list-style-type: none">A function on the camera to compensate for different colours of light being emitted by different light sources.

Other web sites you can go to for more terms

www.dpreview.com/learn/?/glossary/

<http://cameras.about.com/cs/digitalcamera101/a/glossary.htm>

www.digitalcamera-hq.com/digital-cameras/glossary-info_guide.html

www.hp.com/united-states/consumer/digital_photography/articles/digital_glossary.html

