



# Digital Camera Seminar

**Tips For Buying And Using A Digital Camera**

**Frank Doherty**

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# Objectives

- ❑ Increased knowledge of digital cameras.
- ❑ Increased knowledge of what to consider when deciding to buy a camera.
- ❑ Increased knowledge of the things you can do with a digital camera.



# Camera Types and Features

## □ Types

- Subcompact and compact
  - Subcompact
  - Compact
- Enthusiast and Super Zoom
  - Enthusiast
  - Super Zoom
- Digital SLR
  - Amateur
  - Professional



# What To Consider When Buying

- ❑ Image quality
- ❑ Feature set
- ❑ Ergonomics
- ❑ Costs



## Tips To Consider

- ❑ Consider output needs (8x10, etc.) and megapixels needed (guide)
- ❑ Right feature set for ones using the camera.
- ❑ Brightness and size of LCD
- ❑ Consider extras in calculating costs
- ❑ Transfer to your computer-USB type



# Tips To Consider

- ❑ Size of viewfinder
- ❑ Types of batteries
- ❑ Zoom (optical)
- ❑ Pocket-size instruction manuals
- ❑ For youngsters, keep it simple
- ❑ Test how fast the camera performs—  
shutter lag



# Resources

- ❑ PC Magazine Buyers Guide
- ❑ <http://www.dpreview.com>
- ❑ Local bookstores. Lots of photography magazines
- ❑ Local stores: Glen's, [Costco](#), [Circuit City](#)
- ❑ PC Magazine:  
<http://www.pcmag.com/category2/0,1874,5,00.asp>
- ❑ <http://www.Luminous-landscape.com>



# After The Purchase

- Moving pictures onto your computer
    - USB from camera
    - Card reader
  - Organizing pictures
    - Free or commercial software
      - [Picasa 2](#) by Google
  - Fixing pictures
    - Most common problems will want to fix.
      - Lighting, red-eye, crop, color correction
-



# Printing Pictures

- ❑ Online (Costco, Wal-Mart)
- ❑ Printing at home
- ❑ Local photo labs (King, Costco, Wal-Mart)
  
- ❑ Questions
- ❑ A final show



Unable to connect

## Digital Cameras: The Essential Buying Guide

ARTICLE DATE: 09.25.04

By [Daniel Grotta](#) and [Sally Wiener Grotta](#)

Shopping for a digital camera is stressful. Most stores carry a fraction of the 200-plus cameras on the market, and except at specialty stores, salespeople aren't much help. You can ask friends for recommendations, but even if they love their camera, it might be discontinued, given short product cycles. Don't throw up your hands and give up. A little information, some strategizing, and our reviews can make the process less traumatic.

Like PCs, cell phones, and cars, digital cameras come in many sizes, shapes, and configurations. And your buying decision is likewise one you'll have to live with for a while. So break the decision down into a series of factors, then compare cameras based on how well they meet your needs, factor by factor. To determine which camera is best for you, consider image quality, performance, ergonomics, and style, your level (current or hoped for) of photographic skills, and price.

### RELATED LINKS

[Find a Digital Camera!](#)

The bottom line is money. When shopping for any luxury item, the best strategy is first to decide what you can pay. Decide on form factor, features, and the rest based on what you're actually likely to use. Then look for a camera that meets your budget.

We categorize digital cameras into compact, ultracompact, superzoom, enthusiast, and digital SLR, or D-SLR.

**Compact** cameras aren't the best, fastest, most stylish, smallest, or most flexible digital cameras. They take reasonable pictures and have reasonable feature sets. They generally also offer better performance, LCDs, and optics than the sexier, pricier ultracomps.

Compacts lack the pro features and performance characteristics of higher-end cameras but fit into handbags or roomy pockets. This is by far the most popular camera category—particularly among bargain-conscious shooters and women—and it represents the best value for the average user. Unless you need a higher-end or smaller camera, this is the type of camera you should consider first. Typical compacts offer great value for money. But not all compacts offer sensibility over luxury.

**Ultracomps** are small enough to fit in your palm and stylish enough for any social milieu: They'll fit into tiny bags or suit jacket pockets without ruining their lines. They can be simple—or sophisticated high-megapixel powerhouses. Either way, performance, features, and image quality generally take a back seat to form factor and style. Ultracomps are for those who want the coolest toys and a camera always on hand.

**Enthusiast** cameras are full-size models built on bigger budgets than compacts. They offer more precise controls, better lenses, and more features. Most important, they provide superior images, suitable for larger prints. They tend to have lenses that can zoom in closer, faster performance, histograms, exposure bracketing, high resolution, and manual controls for shutter speed, f-stop, and white balance. They're for users who don't want to spend the money on a D-SLR but still want versatility, quick and sure handling, and fast shooting.

**Superzooms**, which have 10X or greater optical zoom lenses, are a subset of enthusiast cameras. Their large lenses put them into the full-size category, but their prices tend to fall between those of compact and enthusiast models. While some superzooms have high-end features, their users often prefer automatic settings. Some correct for camera shake—which is greater the more you zoom in—via image stabilization.

**D-SLRs** are at the pinnacle of digital cameras, with true reflex through-the-lens viewfinders, interchangeable lenses, total control over exposure and color, and a host of accessories. Besides pro features and functions, D-SLRs yield performance similar to those of 35-mm film cameras. Most important, they also produce the best image quality of any type of digital camera. D-SLRs usually have fully automatic settings, but to get your money's worth, you'll have to be the kind of shutterbug who likes manual controls. D-SLR users include avid amateurs, pros, and those who need top-of-the-line equipment, regardless of cost.

**Megapixels** make great sound bites, but optics and processing algorithms are also important. Indeed, just a few sensor manufacturers supply camera makers, so two cameras with the same MP rating may have the same sensor. And we've seen cameras produce better pictures than cameras in the same class with a higher MP count.

MP ratings are useful for determining how large you can print images—as well as how much you can crop images and still retain acceptable image quality. See "Get to Know Your Camera and "More Than Just Megapixels" for more on megapixels.

**Image quality** is a more useful measure. Most digital cameras produce good images, with color fidelity, sharpness, and dynamic range that will satisfy most users. We rate image capabilities by sharpness (the more lines of resolution a camera can distinguish, the better) and the percentage of transition pixels on a subject's edges (the fewer, the better). We also consider color reproduction and exposure accuracy. For more on image quality and how we measure it, see our explanation in "Superzooms".

If you plan to e-mail your pictures or print them on your ink jet using low-grade paper, you needn't be picky. Other criteria, such as price and size, may be more important. If you want razor-sharp, professionally finished 8-by-10 prints with colors that pop, then image quality is key.

To get top image quality, select from among cameras that we rate at 4 or 5 stars. We won't give a camera these scores if its pictures aren't good, no matter how cool it looks or what bells and whistles it has.

**Digital cameras are getting faster**, but they're still slower than film cameras. We test each camera's boot time (how quickly it can start up and be ready to shoot) and recycle time (how long it takes to shoot, process, and be ready for another shot). Long boot times are annoying, long recycle times more so. Make sure you can live with a camera's speeds. Try it out, or, if you can't, use a stopwatch to see what a 5-second recycle time really means.

**Is the feature set right?** Taking digital photos can be as simple as pointing the camera and pressing the shutter button. But digital cameras can also provide as much control over exposure, color, dynamic range, and so on as you want. Also consider extras like in-camera red-eye removal and panorama modes. In general, however, we'd pick a camera that takes better pictures over one with many features. You can always remove red-eye later, but you can't add in detail that a poor camera missed.

**Ergonomics and style** matter, too. When you try on shoes, you consider what they look like and how they feel. Apply similar criteria to each camera: How does it feel to hold? Is it too large or too heavy? Does a plastic body feel too flimsy? Are the controls sensibly placed? Are there too many or too few? Are the menus easy to navigate? The best menus explain features and settings and even give shooting advice. And don't forget vanity: Does the camera suit your style, or will it embarrass you?

Pros	Cons
<ul style="list-style-type: none"> <li>You'll never have to pay for film or processing again.</li> <li>It's like a Polaroid on steroids: You can see your captured shot immediately.</li> <li>From shooting the camera to posting on the Web to generating a print from your ink jet printer—the whole process takes only minutes.</li> <li>If you don't like the shot you just took, you can instantly erase it and shoot it again.</li> <li>Some digital cameras allow you to shoot videos or record and play MP3 sound clips, and some double as a Web camera.</li> </ul>	<ul style="list-style-type: none"> <li>Digital cameras cost a lot more than comparable film cameras.</li> <li>Generally, image quality may not be as good and the size of the enlargements may be limited because of the digital camera's resolution.</li> <li>There's always a time delay from when you turn the camera on until it's ready, as well as from the instant you press the shutter and the picture is actually captured.</li> <li>Digital cameras eat batteries, so you'll always be buying or recharging them.</li> <li>It's difficult to see anything in the LCD viewfinder in bright sunlight.</li> </ul>

Zeroing in on the digital camera best suited to your needs can be difficult, especially with the complex array of features and functions available. Not to worry. These 10 buying tips will help you find a camera that fits your needs, budget, and shooting style.

- Select a digital camera with a maximum resolution that meets your largest output you're likely to want. If you want to make 8-by-10 prints, we recommend a 4-megapixel model, though a 3MP camera will do the job. A good 8-megapixel camera can take you all the way up to 16-by-20 prints. If all you want is to take pictures for e-mail or the Web, even 2MP camera will suffice. And remember, megapixels correspond only to image size, not quality.
- Make sure the camera has the right features for your needs, such as video recording, an optical zoom lens—perhaps even manual controls and a histogram. If you wear eyeglasses but like to take pictures without them, make sure that your camera has a focusable diopter, which lets you adjust the focus of the viewfinder so you can see your subject clearly.
- Choose a model with a bright LCD so you can see it when shooting outdoors. And make sure the screen is large enough so you can easily compose and review your images on the camera.
- When comparing costs, don't forget to calculate the extras that may or may not be included, such as rechargeable batteries and a charger, , and a memory card with a high enough capacity to hold all your pictures until you can download them to a PC.
- Nearly all digital cameras have a USB interface. For higher-megapixel models, try to find one that supports USB 2.0 so you can transfer large image files quickly.

6. When looking at digital cameras with a zoom lens, what counts is the optical zoom—not the digital zoom. Digital zoom is actually a software function that involves cropping and magnifying an image, resulting in a loss of image quality.
7. If you don't know an f-stop from a white balance, a digital camera that has lots of modes and manual settings will generally be overkill for your needs, as well as being higher in price and more difficult to use.
8. Look for a digital camera that comes with a pocket-size instruction manual instead of one on a CD-ROM. It's easier to consult when you're out shooting.
9. For small, young, or arthritic hands, look for a digital camera with a limited number of buttons, and make sure they're large and easy to access and press.
10. Test how fast the camera performs. You will probably be unhappy with any digital camera that takes longer than 4 seconds to boot up or longer than 6 seconds between shots.

**Aperture** An adjustable iris or opening through which light enters a camera's lens. The larger the aperture is, the greater the camera's photosensitivity. A smaller aperture, however, gives greater *depth of field* to a picture. The aperture setting is called the f-stop. A small aperture has a relatively high f-number, such as f8 or f11, and a larger aperture has a smaller number, such as f2.8. The aperture setting must be balanced against the *shutter speed*. The faster the shutter speed, the larger the aperture must be, and vice versa, to admit the right amount of light to the image sensor for proper exposure.

**Compression** A process that reduces the amount of data representing an image so that the file takes up less space in your camera, memory card, and computer. Compressing and saving an image actually takes less time than saving an uncompressed image. Smaller files are quicker to use for e-mail and on the Web. When a file is overcompressed, however, image quality can be seriously degraded.

**Depth of field** An indication of how much of a scene will be sharp and in focus. A greater depth of field implies an increased distance between well-focused background and foreground, with everything in between properly focused. A narrow depth of field concentrates its area of focus within a small range, based on the central subject's distance from the camera. For instance, if your subject is standing alone in a ballpark, using a narrow depth of field will make most of the ballpark look blurry; only the subject will be focused. A greater depth of field might keep most of the ballpark in focus.

**Image sensor** The semiconductor chip in a digital camera that replaces film. It captures the light of a scene or subject, which it turns into electrical signals that the camera can understand and use. The camera in turn converts these signals to digital data that your computer can understand and use. The most common image sensor types are CCD (charge-coupled device) and CMOS (complementary metal-oxide semiconductor).

**Interpolation** A process that increases the image file size and can occur either in your camera or by computer software. Interpolation allows a picture to be magnified but does not improve image quality and can decrease sharpness. It is the opposite of *compression*.

**LCD viewfinder** A small electronic screen on the back of a digital camera that displays what the lens sees. You would use it to compose your picture, choose your settings, focus and frame an image in macro mode, and view just-shot photos.

**Megapixel** A measure of a digital camera's resolution. A one-megapixel rating means that the camera can capture up to 1 million *pixels*, or points of data.

**Memory card** A small, removable storage device that saves the images a digital camera captures. When it is full, you can swap one memory card for another and continue shooting. A card reader can be attached to your computer for opening and saving image files outside of your camera. Memory cards come in various densities, as do any other drives or storage devices. The most common types of memory cards are CompactFlash, SmartMedia, and Secure Data (SD), with Sony's Memory Stick a distant fourth. You must use the right type of card for your digital camera.

**Pixel** A point of data in a digital image; the word is short for *picture element*. A digital camera's resolution is a measure of the number of pixels it can capture on its image sensor.

**Shutter speed** A measure of how long a camera allows light to fall on the active image sensor (expressed as a fraction of a second). In traditional film cameras, there is a physical, mechanical shutter in the lens that opens and closes to regulate how long the film is exposed to light. Though many digital cameras have both electronic and mechanical shutters, inexpensive models rely solely on electronic shutters that turn off the photosensitivity of the image sensors.

# How to Buy a Digital Camera

Friday, November 03, 2006 1:00 AM PST



## Introduction



Digital photography keeps getting better. Higher resolution, more sophisticated controls, and better technology all make taking great pictures easier than ever.

### The Big Picture

From resolution to storage and from exposure control to white balance, we'll explain the digital camera terms you need to know. [more](#)

### The Specs Explained

Buying a digital camera isn't all about megapixels. We'll translate the jargon and tell you just how important each specification is to your purchase. [more](#)

## Digital Camera Shopping Tips

Before you head to the store, check out our advice for making a smart digital camera choice. [more](#)



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### The Big Picture

Megapixels still matter a lot to digital camera shoppers, in part because manufacturers and retailers hype that specification above all others. If you're having a hard time figuring out which camera to buy, you may be tempted to make a decision based solely on megapixel count; that's why nearly all manufacturers print the number on the front of their cameras.

But a camera needs more than just a high pixel count to take great pictures, so pay attention to other traits as well. For example, a lethargic camera that takes too much time between shots may miss the best action, and a big, heavy camera may spend more time on the shelf than in your carry-on bag. A camera with no manual controls may take fabulous shots in bright sunlight, but lousy ones in more challenging situations.

### Key Features

#### Resolution:

If you intend to take pictures only to e-mail them to distant friends or to print at snapshot size, a camera of most any resolution will do. Even so, having more pixels gives you greater flexibility--you can print sharper pictures at larger sizes, or crop and print small sections of pictures. These days most cameras offer a resolution of at least 5 megapixels, which is enough to make a sharp 11-by-14 print.

#### Size, weight, and design:

To some users, how much a camera weighs and whether it fits in a pocket may be more important factors than resolution. *PC World* has tested cameras that weigh as much as 2.3 pounds and as little as 4.2 ounces. Small cameras are convenient, but they frequently have tiny dials and few buttons, which make changing settings somewhat trying.

**Zoom lens:**

Inexpensive cameras often lack a powerful optical zoom lens. If we had to choose between a camera with more optical zoom and one with higher resolution, we'd take the model with the more powerful zoom lens--it means you won't have to magnify your subject and then use software to crop the image (and discard some of the resolution as a result). A few cameras now offer zoom ratings of up to 12X. These lenses are great for nature or sports photography, but you may need a steady hand or a tripod to avoid blurry pictures at extreme telephoto lengths if the camera doesn't have image stabilization. You should try a camera's autofocus at full zoom: We've tested some models that were slow to focus at full zoom in low light.

Be wary of advertised zoom ratings--many vendors combine the optical zoom (which moves the lens to magnify the subject) with digital zoom, which merely captures fewer pixels and magnifies those. Optical zoom gives you all the benefit of the camera's maximum resolution, combined with the ability to get closer to the action.

**Manual focus:**

For close-ups or situations in which the camera can't get a focus lock, switching to manual focusing can help you get the shot. Low-end cameras often omit manual focusing or allow only stepped focusing, which forces you to choose from a few preset distances.

**Storage:**

At its highest resolution, a typical 5-megapixel camera can store six to eight images on a 16MB "starter" memory card. The size of the memory card a camera ships with isn't terribly important, because you'll almost always have to buy another one (unless you're willing to transfer your images after every handful of shots). CompactFlash, SD (Secure Digital) Cards, and SmartMedia cards cost about \$20 to \$30 for 512MB, or \$60 to \$100 for 2GB.

**Batteries:**

Cameras use one or more of several types of batteries: AAs, either nonrechargeable alkaline (\$5 for four) or rechargeable nickel metal hydride (NiMH, about \$14 for four); high-capacity disposable CRV3s (around \$10 apiece, and some cameras take two); or proprietary rechargeable batteries that can cost \$25 to \$65 to replace.

**Movies and sound:**

Many cameras can capture video as well as still shots; this option is useful for taking short clips when you don't have a camcorder. Some models also will record an audio caption for still photos.

**Exposure settings:**

All digital cameras let you shoot in fully automatic mode--just press the shutter release and you get a picture. Most cameras also offer aperture- and shutter-priority modes, in which you adjust the size of the lens opening or how long the shutter stays open, and the camera automatically controls the other variable to give you the proper exposure.

Typically, you'd use aperture priority to maintain control over an image's depth of field--for example, to blur the background of a shot while keeping the foreground sharp--and shutter-priority mode to capture fast-moving subjects. A camera that relies exclusively on full auto would attempt to keep both the foreground and background in focus in the former example, and it would probably blur the moving subject in the latter.

Usually, cameras that offer priority modes also provide full-manual exposure control, in which you set both variables. These modes make a camera adaptable to almost any situation.

**Menus:**

When evaluating a camera, consider how easily you can reach common settings--resolution, macro mode, flash, and exposure adjustments--and how easily you can play back just-taken images. Too many buttons, and you waste time trying to figure out which button does what; too many menus, and you waste time digging through them.

**Scene modes:**

Some cameras try to entice prospective buyers, particularly beginning photographers, with a large number of scene modes--presets that are designed for a variety of settings and subjects, such as the beach, fireworks, and underwater. However, selecting one of these less common modes usually requires a trip to the menus, and multiple button presses. Some cameras let you assign one of the modes--or a custom mode of your creation--to a position on the control dial, where you can more easily access it. Some single-lens reflex (SLR) cameras offer multiple positions on their control dial for storing customized settings. Some point-and-shoots allow you to store customized settings as a mode within the scene modes menu.

**White balance:**

Almost all digital cameras allow you to choose a white-balance setting via presets. This setting tells the camera which elements in a shot should look white, and then by inference which elements should look black and what everything in between should look like. If you're finicky about color accuracy, look for a custom white balance mode in which you press the shutter button while aiming at a white object.

**LCD and viewfinder:**

All digital cameras have an LCD screen; these vary in size from 1.8 to 3.5 inches. The smaller size limits your ability to review just-taken images on the camera. A good LCD is essential for knowing whether you got the shot you wanted, and can usually give you an indication of whether it was properly exposed. LCD quality varies widely: Many wash out in sunlight or become grainy in low light, or the image may change if you tilt the camera slightly. If you can, try a camera outside before you buy it. Some cameras also have a viewfinder, which is a convenient backup for framing your shots (and if you turn off the LCD when not using it, you'll save battery power). Perhaps the best way to ensure an accurate exposure is to view the photograph's histogram on the LCD (if the camera offers this feature). A histogram is a graph that will show you highlights that are overexposed to the point of being pure white, and shadows that are underexposed and show as pure black.

**Antishake:**

Some cameras offer antishake (also called image stabilization) as a shooting mode or as a feature that can be turned on and off. This is helpful when you're shooting photos in situations where it's difficult to get a sharp image, such as in low light. One disadvantage of an antishake shooting mode is that you can't use the feature in conjunction with another scene mode. Most point-and-shoot cameras use software to sharpen the resulting images. More advanced cameras, including SLRs, tend to employ one of two methods: optical image stabilization, in which an element in the lens adjusts to compensate for movement); or sensor movement, in which the camera's sensor moves in order to compensate for the shaking.

**Wireless:**

Using Wi-Fi to transmit images to a PC or printer may sound enticingly free of entanglements, but we'd recommend that you try this feature beforehand. In our reviewers' experience, sending Wi-Fi transmissions did not work seamlessly in most cases, and as a result was not worth the extra money this feature added to the camera's cost.

**The Specs Explained**

A digital camera's megapixel count is an important spec--but it is by no means the only one. Start with pixels, but make sure to check a few other important numbers when considering a purchase.

A camera's megapixel rating is another way of expressing its resolution. The higher the megapixel number, the higher the resolution. In general, higher-resolution cameras let you produce larger, higher-quality prints. Even a 4-megapixel camera (which is rare these days) can produce images of high enough resolution to produce crisp 8-by-10 prints. The trade-off is that higher-resolution images take up more space on your camera's memory card, so you may be able to take only a small number of shots before you have to download them to your computer. The solution, of course, is to purchase a larger-capacity memory card.

So if you're interested in producing mostly small snapshots or images to send via e-mail or post on the Web, you probably don't need anything better than a 4-megapixel camera. If you want to create large copies of your masterworks, you'll want a camera that captures 5 megapixels or more.

**Important: Battery Life**

Some digital cameras quickly drain batteries--especially alkaline batteries--which can be expensive and annoying. Battery life and cost often aren't related; some inexpensive cameras have great battery life, and some expensive ones use up a charge quickly. Either way, it's a good idea to buy spare batteries.

**Somewhat Important: Megapixels**

This figure provides a measure of how much fine detail a camera can capture. With more megapixels, you can print larger photos with better image quality. But most current models offer at least 5 megapixels, which is enough to make a sharp 11-by-14-inch print.

**Somewhat Important: Exposure Controls**

Some models offer aperture and shutter priority modes, as well as full manual control. Aperture and shutter priority modes allow you to customize the lens opening and shutter speed, respectively. Serious photographers will value these controls, as well as full manual control. Scene modes automate exposure settings, and some point-and-shoots offer many such presets, though accessing the bulk of them is likely to require a trip to the LCD menu.

## Somewhat Important: Focal Range

Cameras with greater focal range can zoom out to fit more into a shot or zoom in to fill the frame with the subject. Optical zoom produces sharper images than digital zoom. All new point-and-shoot and advanced cameras offer at least a 3X zoom, and some offer up to 12X zoom (the zoom of a single-lens reflex camera depends on the lens). However, using powerful magnification makes the camera more susceptible to slight shaking, which can result in a blurry shot. If you want a camera with a powerful optical zoom, look for one that offers optical image stabilization.

## Somewhat Important: Manual Focus Override

Focusing the camera yourself can be more accurate than using automatic focus in some situations. SLRs offer a focus ring on their lenses, as do most advanced models. Point-and-shoot cameras, however, require that you use a button to adjust manual focus (if they offer manual focus at all). Some point-and-shoots provide only a stepped manual focus, meaning that you can set its focus only at a few predetermined distances.

## Digital Camera Shopping Tips

Ready to buy a digital camera? Here are *PC World's* recommendations:

### Match megapixels to your use:

Most point-and-shoot cameras offer at least 4 megapixels, which is plenty for producing 8-by-10-inch prints. Cameras with more megapixels will yield even larger prints and allow you to blow up a part of an image with less likelihood that the print will be blurry. If you plan to make only 4-by-6-inch prints, you don't have to shoot at the camera's highest resolution--and as a result, you can fit more shots on your memory card.

### Look for rechargeable batteries and a charger:

The cost of disposable batteries adds up over the long run. Some cameras can use AA batteries of any type--disposable or rechargeable. That capability can be helpful if your rechargeable batteries run out of juice and you don't want to wait while they replenish.

### Disregard digital zoom:

Most cameras offer at least 3X optical zoom--and some boast an optical zoom as high as 12X. But sometimes vendors tout a high total zoom that includes digital zoom, which you should disregard: Digital zoom produces photos that are inferior to those produced with an optical zoom.

### Look for a low-light focusing aid:

Some cameras have auxiliary lights that help them focus in dim settings. That's important for many indoor shots.

### Try the camera before you buy:

Some cameras have commands and menus that are easier to use than others, a comparison you can make only with a hands-on trial. Also evaluate the lag time between when you press the shutter button and when the camera actually takes the picture. Try the zoom lens--does it operate quickly and smoothly? Find out how long you must wait between taking pictures. And try the LCD viewfinder--in the sun if possible--to determine how easy it is to read.

**Give extra consideration to a camera with a good selection of software:** Look for useful packages such as [Adobe Photoshop Elements](#), [Ulead PhotoImpact](#), and [Corel Snapfire](#) for editing images, as well as applications for organizing and sharing them.

### Don't base your decision on video capability:

Any still camera's ability to take moving pictures is limited. If you want to shoot video, invest in a camcorder dedicated to the job.

**Consider investing in a memory card reader or a camera dock:** A memory card reader acts like an external hard drive attached to your PC or laptop, allowing you to download pictures directly from your camera's storage media. Many newer laptops have one or more memory card slots built in, as do some inkjet printers. If you have a second memory card, you can keep shooting while the images download, rather than having to keep the camera hooked up to your PC. Alternatively, some cameras come with a dock or offer one as an option, and some of these docks offer a dedicated button for uploading all of your new photos on a memory card. A dock also charges the camera's battery.

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But a camera needs more than just a high pixel count to take great pictures, so pay attention to other traits as well. For example, a lethargic camera that takes too much time between shots may miss the best action, and a big, heavy camera may spend more time on the shelf than in your carry-on bag. A camera with no manual controls may take fabulous shots in bright sunlight, but lousy ones in more challenging situations.

### Key Features

#### Resolution:

If you intend to take pictures only to e-mail them to distant friends or to print at snapshot size, a camera of most any resolution will do. Even so, having more pixels gives you greater flexibility--you can print sharper pictures at larger sizes, or crop and print small sections of pictures. These days most cameras offer a resolution of at least 5 megapixels, which is enough to make a sharp 11-by-14 print.

#### Size, weight, and design:

To some users, how much a camera weighs and whether it fits in a pocket may be more important factors than resolution. *PC World* has tested cameras that weigh as much as 2.3 pounds and as little as 4.2 ounces. Small cameras are convenient, but they frequently have tiny dials and few buttons, which make changing settings somewhat trying.

**Zoom lens:**

Inexpensive cameras often lack a powerful optical zoom lens. If we had to choose between a camera with more optical zoom and one with higher resolution, we'd take the model with the more powerful zoom lens--it means you won't have to magnify your subject and then use software to crop the image (and discard some of the resolution as a result). A few cameras now offer zoom ratings of up to 12X. These lenses are great for nature or sports photography, but you may need a steady hand or a tripod to avoid blurry pictures at extreme telephoto lengths if the camera doesn't have image stabilization. You should try a camera's autofocus at full zoom: We've tested some models that were slow to focus at full zoom in low light.

Be wary of advertised zoom ratings--many vendors combine the optical zoom (which moves the lens to magnify the subject) with digital zoom, which merely captures fewer pixels and magnifies those. Optical zoom gives you all the benefit of the camera's maximum resolution, combined with the ability to get closer to the action.

**Manual focus:**

For close-ups or situations in which the camera can't get a focus lock, switching to manual focusing can help you get the shot. Low-end cameras often omit manual focusing or allow only stepped focusing, which forces you to choose from a few preset distances.

**Storage:**

At its highest resolution, a typical 5-megapixel camera can store six to eight images on a 16MB "starter" memory card. The size of the memory card a camera ships with isn't terribly important, because you'll almost always have to buy another one (unless you're willing to transfer your images after every handful of shots). CompactFlash, SD (Secure Digital) Cards, and SmartMedia cards cost about \$20 to \$30 for 512MB, or \$60 to \$100 for 2GB.

**Batteries:**

Cameras use one or more of several types of batteries: AAs, either nonrechargeable alkaline (\$5 for four) or rechargeable nickel metal hydride (NiMH, about \$14 for four); high-capacity disposable CRV3s (around \$10 apiece, and some cameras take two); or proprietary rechargeable batteries that can cost \$25 to \$65 to replace.

**Movies and sound:**

Many cameras can capture video as well as still shots; this option is useful for taking short clips when you don't have a camcorder. Some models also will record an audio caption for still photos.

**Exposure settings:**

All digital cameras let you shoot in fully automatic mode--just press the shutter release and you get a picture. Most cameras also offer aperture- and shutter-priority modes, in which you adjust the size of the lens opening or how long the shutter stays open, and the camera automatically controls the other variable to give you the proper exposure.

Typically, you'd use aperture priority to maintain control over an image's depth of field--for example, to blur the background of a shot while keeping the foreground sharp--and shutter-priority mode to capture fast-moving subjects. A camera that relies exclusively on full auto would attempt to keep both the foreground and background in focus in the former example, and it would probably blur the moving subject in the latter.

Usually, cameras that offer priority modes also provide full-manual exposure control, in which you set both variables. These modes make a camera adaptable to almost any situation.

**Menus:**

When evaluating a camera, consider how easily you can reach common settings--resolution, macro mode, flash, and exposure adjustments--and how easily you can play back just-taken images. Too many buttons, and you waste time trying to figure out which button does what; too many menus, and you waste time digging through them.

**Scene modes:**

Some cameras try to entice prospective buyers, particularly beginning photographers, with a large number of scene modes--presets that are designed for a variety of settings and subjects, such as the beach, fireworks, and underwater. However, selecting one of these less common modes usually requires a trip to the menus, and multiple button presses. Some cameras let you assign one of the modes--or a custom mode of your creation--to a position on the control dial, where you can more easily access it. Some single-lens reflex (SLR) cameras offer multiple positions on their control dial for storing customized settings. Some point-and-shoots allow you to store customized settings as a mode within the scene modes menu.

**White balance:**

Almost all digital cameras allow you to choose a white-balance setting via presets. This setting tells the camera which elements in a shot should look white, and then by inference which elements should look black and what everything in between should look like. If you're finicky about color accuracy, look for a custom white balance mode in which you press the shutter button while aiming at a white object.

**LCD and viewfinder:**

All digital cameras have an LCD screen; these vary in size from 1.8 to 3.5 inches. The smaller size limits your ability to review just-taken images on the camera. A good LCD is essential for knowing whether you got the shot you wanted, and can usually give you an indication of whether it was properly exposed. LCD quality varies widely: Many wash out in sunlight or become grainy in low light, or the image may change if you tilt the camera slightly. If you can, try a camera outside before you buy it. Some cameras also have a viewfinder, which is a convenient backup for framing your shots (and if you turn off the LCD when not using it, you'll save battery power). Perhaps the best way to ensure an accurate exposure is to view the photograph's histogram on the LCD (if the camera offers this feature). A histogram is a graph that will show you highlights that are overexposed to the point of being pure white, and shadows that are underexposed and show as pure black.

**Antishake:**

Some cameras offer antishake (also called image stabilization) as a shooting mode or as a feature that can be turned on and off. This is helpful when you're shooting photos in situations where it's difficult to get a sharp image, such as in low light. One disadvantage of an antishake shooting mode is that you can't use the feature in conjunction with another scene mode. Most point-and-shoot cameras use software to sharpen the resulting images. More advanced cameras, including SLRs, tend to employ one of two methods: optical image stabilization, in which an element in the lens adjusts to compensate for movement); or sensor movement, in which the camera's sensor moves in order to compensate for the shaking.

**Wireless:**

Using Wi-Fi to transmit images to a PC or printer may sound enticingly free of entanglements, but we'd recommend that you try this feature beforehand. In our reviewers' experience, sending Wi-Fi transmissions did not work seamlessly in most cases, and as a result was not worth the extra money this feature added to the camera's cost.

**The Specs Explained**

A digital camera's megapixel count is an important spec--but it is by no means the only one. Start with pixels, but make sure to check a few other important numbers when considering a purchase.

A camera's megapixel rating is another way of expressing its resolution. The higher the megapixel number, the higher the resolution. In general, higher-resolution cameras let you produce larger, higher-quality prints. Even a 4-megapixel camera (which is rare these days) can produce images of high enough resolution to produce crisp 8-by-10 prints. The trade-off is that higher-resolution images take up more space on your camera's memory card, so you may be able to take only a small number of shots before you have to download them to your computer. The solution, of course, is to purchase a larger-capacity memory card.

So if you're interested in producing mostly small snapshots or images to send via e-mail or post on the Web, you probably don't need anything better than a 4-megapixel camera. If you want to create large copies of your masterworks, you'll want a camera that captures 5 megapixels or more.

**Important: Battery Life**

Some digital cameras quickly drain batteries--especially alkaline batteries--which can be expensive and annoying. Battery life and cost often aren't related; some inexpensive cameras have great battery life, and some expensive ones use up a charge quickly. Either way, it's a good idea to buy spare batteries.

**Somewhat Important: Megapixels**

This figure provides a measure of how much fine detail a camera can capture. With more megapixels, you can print larger photos with better image quality. But most current models offer at least 5 megapixels, which is enough to make a sharp 11-by-14-inch print.

**Somewhat Important: Exposure Controls**

Some models offer aperture and shutter priority modes, as well as full manual control. Aperture and shutter priority modes allow you to customize the lens opening and shutter speed, respectively. Serious photographers will value these controls, as well as full manual control. Scene modes automate exposure settings, and some point-and-shoots offer many such presets, though accessing the bulk of them is likely to require a trip to the LCD menu.

## Somewhat Important: Focal Range

Cameras with greater focal range can zoom out to fit more into a shot or zoom in to fill the frame with the subject. Optical zoom produces sharper images than digital zoom. All new point-and-shoot and advanced cameras offer at least a 3X zoom, and some offer up to 12X zoom (the zoom of a single-lens reflex camera depends on the lens). However, using powerful magnification makes the camera more susceptible to slight shaking, which can result in a blurry shot. If you want a camera with a powerful optical zoom, look for one that offers optical image stabilization.

## Somewhat Important: Manual Focus Override

Focusing the camera yourself can be more accurate than using automatic focus in some situations. SLRs offer a focus ring on their lenses, as do most advanced models. Point-and-shoot cameras, however, require that you use a button to adjust manual focus (if they offer manual focus at all). Some point-and-shoots provide only a stepped manual focus, meaning that you can set its focus only at a few predetermined distances.

## Digital Camera Shopping Tips

Ready to buy a digital camera? Here are *PC World's* recommendations:

### Match megapixels to your use:

Most point-and-shoot cameras offer at least 4 megapixels, which is plenty for producing 8-by-10-inch prints. Cameras with more megapixels will yield even larger prints and allow you to blow up a part of an image with less likelihood that the print will be blurry. If you plan to make only 4-by-6-inch prints, you don't have to shoot at the camera's highest resolution--and as a result, you can fit more shots on your memory card.

### Look for rechargeable batteries and a charger:

The cost of disposable batteries adds up over the long run. Some cameras can use AA batteries of any type--disposable or rechargeable. That capability can be helpful if your rechargeable batteries run out of juice and you don't want to wait while they replenish.

### Disregard digital zoom:

Most cameras offer at least 3X optical zoom--and some boast an optical zoom as high as 12X. But sometimes vendors tout a high total zoom that includes digital zoom, which you should disregard: Digital zoom produces photos that are inferior to those produced with an optical zoom.

### Look for a low-light focusing aid:

Some cameras have auxiliary lights that help them focus in dim settings. That's important for many indoor shots.

### Try the camera before you buy:

Some cameras have commands and menus that are easier to use than others, a comparison you can make only with a hands-on trial. Also evaluate the lag time between when you press the shutter button and when the camera actually takes the picture. Try the zoom lens--does it operate quickly and smoothly? Find out how long you must wait between taking pictures. And try the LCD viewfinder--in the sun if possible--to determine how easy it is to read.

**Give extra consideration to a camera with a good selection of software:** Look for useful packages such as [Adobe Photoshop Elements](#), [Ulead PhotoImpact](#), and [Corel Snapfire](#) for editing images, as well as applications for organizing and sharing them.

### Don't base your decision on video capability:

Any still camera's ability to take moving pictures is limited. If you want to shoot video, invest in a camcorder dedicated to the job.

**Consider investing in a memory card reader or a camera dock:** A memory card reader acts like an external hard drive attached to your PC or laptop, allowing you to download pictures directly from your camera's storage media. Many newer laptops have one or more memory card slots built in, as do some inkjet printers. If you have a second memory card, you can keep shooting while the images download, rather than having to keep the camera hooked up to your PC. Alternatively, some cameras come with a dock or offer one as an option, and some of these docks offer a dedicated button for uploading all of your new photos on a memory card. A dock also charges the camera's battery.