1

The Digital SLR Difference

In This Chapter

- Discovering why digital SLRs are a big deal
- Exploring dSLR advantages
- Looking at downsides? What downsides?

Now that you can buy a fully featured digital SLR (or dSLR) for five Benjamins or less, virtually everyone (including your grandmother) probably knows that SLR stands for *single lens reflex*. However, your Nana — or you, for that matter — might not know precisely what single lens reflex means. *SLR* is a camera (either film or digital) that uses a marvelous system of mirrors or prisms to provide bright, clear optical viewing of the image that you're about to take — through the same lens that the camera uses to take the picture. The very latest dSLRs offer an even more interesting option: the capability to bypass the optical viewfinder and preview your image right on the LCD (liquid crystal display) on the back of the camera (which also uses the same lens that the camera uses to take the picture).

But the key thing to know about dSLRs is that they're very cool tools that you can use to take photos electronically.

Welcome to the chapter that tells you exactly how smart you were when you decided to upgrade from whatever you were using previously to a digital single lens reflex camera. In this chapter, you find out how a digital SLR transforms the way you take and make pictures, why you may find the strengths of the dSLR important, and how even the very few downsides of previous digital SLRs have been vanquished in recent years. Now that digital SLRs have become a big deal, you can get in on the action.

In this chapter, I compare digital SLRs, for the most part, with point-and-shoot cameras, and explain the advantages of the dSLR versus P&S models. From time to time, I also mention a newer type of camera, the mirrorless

interchangeable lens camera (ILC), which is very dSLR-like. But, for the most part, the comparisons are between digital SLRs and amateur cameras with fixed lenses, including point-and-shoot cameras and superzoom/electronic viewfinder models.

dSLR: dNext Great Digital Camera

Digital SLRs are now available to suit every budget. They range from surprisingly capable entry-level models that barely nudge above the $500 price point, to robust intermediate models built for avid amateurs with $1,000 to spend, on up to semipro and pro models for $2,000 and up. So, almost anyone who wants more picture-taking flexibility than a smartphone or point-and-click camera provides can afford to make the jump to a digital SLR. If you already have, you've discovered that the dSLR lets you take pictures the way they're *meant* to be taken.

It's easy to see why enthusiast photographers interested in taking professional-looking photos embrace these features of a digital SLR:

- **You can view a big, bright image that represents (almost) exactly what you see in the final picture.** No peering through a tiny window at a miniature version of your subject with a tiny viewfinder window, or squinting at the LCD of your cell phone or point-and-shoot camera. Digital SLRs have big and bright viewfinders that show virtually the entire image, so you don't have to wonder whether you chopped off the top of someone's head. Using the optical viewfinder, which comes as standard equipment on every dSLR, means that you don't have to squint to compose your image at arm's length on an LCD (liquid crystal display) viewfinder that washes out in bright sunlight. However, if lighting conditions permit, all newer digital SLRs also enable you to preview your picture on the back-panel LCD using *Live View* (just like a point-and-shoot camera), giving you the best of both viewing worlds.
- **A dSLR responds to an itchy trigger finger almost instantly.** Forget about pressing the shutter release and then waiting an agonizing moment before the camera decides to snap the shot. Although newer point-and-shoot cameras are more responsive than older versions, few can match the capability of dSLRs to crank out shots as fast as you can press the button. Even fewer point-and-shoot cameras are capable of the 4-to-11 frames-per-second continuous shooting rates available with some of the digital SLRs aimed at more advanced photographers.
- **You have the freedom to switch among lenses.** Yes, there are some non-dSLR cameras (so-called *mirrorless* models) that are dSLR-like in many ways, and can use interchangeable lenses. But none of them can match

the selection of optics available for the typical dSLR camera, even when you use an adapter that allows fitting lenses from other camera models. You can switch among an all-purpose zoom lens, a superwide-angle lens, an extra-long telephoto lens, a close-up lens, or other specialized optics quicker than you can say *170–500mm F/5–6.3 APO Aspherical AutoFocus Telephoto Zoomexpialidocious.* (Best of all, you don't even have to know what that tongue twister of a name means!)

Just be prepared to succumb to *lens lust,* a strange malady that strikes all owners of dSLRs sooner or later. Before you know it, you find yourself convinced that you *must* have optical goodies, such as the lens shown in Figure 1-1 — a telephoto lens that's absolutely essential (you think) for taking photos of wildlife from enough of a distance to avoid scaring away the timid creatures.

Figure 1-1: Playing with lenses, lenses, and more lenses is one of the inevitable joys of working with a dSLR.

- **If you're a movie nut, you can shoot the best movies of your life.** The latest dSLRs are truly all-in-one cameras, capable of capturing razor-sharp stills and either 720p or 1080p high-definition movies with equal aplomb. They produce better-looking movies than most point-and-shoot cameras, and even exceed the capabilities and quality of the average dedicated camcorder, too. There's an old saying that "The best camera is the one you have with you." It's equally true that the best movie camera is the one you're already holding in your hands when a video opportunity pops up unexpectedly.

If you're ready to say *sayonara* to film, *adiós* to poorly exposed and poorly composed pictures, and *auf Wiedersehen* to cameras that have sluggardly performance, it's time to get started.

The sections that follow (as well as other chapters in this part) introduce you to the technical advantages of the digital SLR and how you can use the dSLR features to their fullest. When you're ready to expand your photographic horizons even further, Parts II, III, and IV help you master the basics of digital

photography, go beyond the basics to conquer the mysteries of photo arenas (such as action, flash, and portrait photography), and then discover how you can fine-tune your images, organizing them for sharing and printing.

Resolution: Peak or plateau?

Only a few years ago, it was common to buy a digital camera based only on the number of pixels — measured in millions of pixels or *megapixels* — because a camera with 24 gazillion pixels obviously must be superior to one with only 18.14159625 gazillion pixels, right? Then photographers discovered that one vendor's 18MP camera produced much better images than another vendor's 24MP camera, especially in terms of image-quality characteristics unrelated to resolution (say, visual noise or color accuracy).

In recent years, digital SLRs have continued to boast more and more pixels, but those other image qualities have gained equal stature in terms of importance. Photographers are looking at the overall picture, in other words. As I write this, resolution seems to be averaging around 21–24 megapixels, with 16–18MP at the low end for entry-level and intermediate models, and 21–24MP for more advanced cameras. Because additional resolution isn't as important as reduced visual noise and other image quality factors, I expect resolution to plateau or peak at the current high of about 36MP during the life of this book.

Full frame: Is it for you?

So-called full-frame cameras have become more affordable, with some models available for less than $2,000. Equipped with sensors the same size as a 35mm film frame — 24 x 36mm — these cameras enjoy the double benefit of offering "true" (non-cropped) fields of view and improved low-light/visual noise characteristics thanks to their larger, light-hungry pixels. (You find out more about lens cropping in Chapter 2.) Wide-angle lenses of a given focal length have a wider field of view when mounted on a full-frame camera, and conversely, longer lenses don't have the same "cropped" telephoto "reach" as they do on a camera with a smaller sensor. Full-frame cameras are generally more expensive, larger, and may force you to buy a whole new complement of lenses that can bathe their larger sensors with light. So, whether one of these models is for you depends on what features you need and how much you want to pay for them. I explain the advantages and disadvantages of full-frame cameras in more detail in Chapter 2.

Improving Your Photography with a dSLR

The differences between digital SLRs and the camera that you used before you saw the (digital SLR) light depends on where you're coming from. If your most recent camera was a point-and-shoot digital model, you know the advantages of being able to review your photos on an LCD screen an

instant after you take them. And, if you're serious about photography, you also understand the benefits of fine-tuning your photos in an image editor. If you're one of the few remaining holdouts only now making the long-delayed switch to a digital SLR from a film SLR, you're likely a photo enthusiast already and well aware that a single lens reflex offers you extra control over framing, using focus creatively, and choosing lenses to produce the best perspective. And, if you're making the huge leap from a point-and-shoot non-SLR film camera to a digital SLR, you're in for some *real* revelations.

A digital SLR has all the good stuff available in a lesser digital camera, with some significant advantages that enable you to take your photo endeavors to a new, more glorious level of excellence. Certainly, you can take close-ups or sports photos by using any good-quality digital camera. Low-light photography, travel pictures, or portraits are all within the capabilities of any camera. But digital SLRs let you capture these kinds of images more quickly, more flexibly, and with more creativity at your fingertips. Best of all (at least, for Photoshop slaves), a digital SLR can solve problems that previously required you to work long hours over a hot keyboard.

Despite the comparisons you can make to other cameras, a digital SLR isn't just a simple upgrade from another type of camera. In the sections that follow, I introduce you to the advanced features and inner workings of a dSLR so that you can begin getting the most out of your camera.

Composing shots with a more accurate viewfinder

When you use non-SLR cameras, what you see isn't always what you get.

Theoretically, an electronic viewfinder (EVF) or the LCD on the back of a digital camera *should* show exactly what you get in the finished picture — and an increasing number of these do just that, offering a 100-percent view of the image you end up with. After all, the same sensor that actually captures the photo produces the EVF or LCD image. In practice, although an electronic viewfinder can be used under a variety of conditions, you might find the typical back panel LCD difficult to view under bright light. It also appears so small when you hold the camera at the requisite arm's length that you may feel like you're trying to judge your image by looking at a postage stamp that's gone through the wash a few times.

You probably find the view through an optical viewfinder window — if it even has one — even worse than the camera's LCD screen: diminutive, inaccurate enough to make chopping off heads alarmingly easy, and offering no information about what is (or isn't) in focus.

More advanced cameras might use an electronic viewfinder, which is a second, internal LCD or OLED (organic LED) that the user views through a window. You can find this kind of viewfinder in many so-called *superzoom*

cameras that have a fixed lens with a versatile, relatively long zoom range. The mirrorless cameras I mention earlier (including the various interchangeable lens models from Panasonic, Olympus, Fuji, or Sony) also may have a built-in or optional supplementary EVF-style viewfinder that you clip onto the top of the camera. EVFs provide a larger image that's formed by the actual light falling on the sensor, and you can use an EVF in full sunlight without the viewfinder washing out. However, EVFs might not have enough pixels to accurately portray your subject, and they may degenerate into blurred, ghosted images if the camera or subject moves during framing. They also don't always work as well in low light levels, when the available light reaching the sensor must be amplified to be easily viewed on the EVF. Although an EVF can be a good compromise between an optical viewfinder and a back panel LCD, an EVF doesn't enable you to preview an image as easily as a dSLR's optical viewfinder does. However, some of the newest mirrorless models include EVFs with up to 2.4 million pixels, and viewing quality so good you think you're peering through an optical viewfinder.

A digital SLR's optical viewfinder, in contrast, closely duplicates what the sensor sees, even though the image is formed optically and not generated by the sensor itself. What you see in the viewfinder is all done with mirrors (and other reflective surfaces) that bounce the light from the lens to your viewfinder, sampling only a little of the light to measure exposure, color, and focus. As a result, the viewfinder image is usually big and bright.

Check out Figure 1-2 and decide which view of your subject you'd rather work with. You may find the 3-inch LCD on the mirrorless interchangeable lens model (in the upper-left corner of Figure 1-2) difficult to view in bright light; the electronic viewfinder (in the upper-right corner of the figure) can give you fuzzy images, making it hard for you to judge focus. The digital SLR's big, bright viewfinder (at the bottom of Figure 1-2) is, as Goldilocks would say, just right.

A dSLR's optical viewfinder shows you approximately what is and isn't in sharp focus (the *depth-of-field*), either in general terms (all the time) or more precisely when you press a handy button called the *depth-of-field preview,* which many dSLRs have. You probably find your dSLR viewing experience more pleasant, more accurate, and better suited for your creative endeavors. If you switch to a camera's Live View mode (if your camera includes that mode) to preview the image on the back-panel LCD, you can often perceive depth-of-field. However, under high light levels, the LCD can be just as difficult to see as on a point-and-shoot camera.

Figure 1-2: A back panel LCD viewfinder (upper-left) or an EVF LCD (upper-right) is no match for a dSLR's optical system (bottom).

Flexing the powerful sensor

With very few exceptions, digital SLR sensors are physically *much* bigger than their point-and-shoot camera counterparts. This size gives them a larger area that can capture light and, potentially, great sensitivity to lower light levels, along with improvements in the ability to make larger prints or crop tightly. (Some non-SLR cameras give up compactness to provide somewhat larger sensors, and mirrorless models can use the same size sensors as dSLR cameras.)

A dSLR's extra sensitivity pays off when you want to

- Take pictures in dim light.
- Freeze action by using shorter exposure times.
- Use smaller lens openings to increase the amount of subject matter that's in sharp focus.

Within the Canon digital camera line alone, you find digital SLRs that have 22.2mm-x-14.8mm to 24mm-x-36mm sensors (the size of a 35mm film frame). By comparison, some of Canon's digital point-and-shoot cameras use a sensor that measures only 7.8mm x 5.32mm. Put in terms that make sense to humans, the dSLR sensors have 8 to 20 times more area than their Lilliputian point-and-shoot sensor-mates. Figure 1-3 gives you a better idea of the relative sizes.

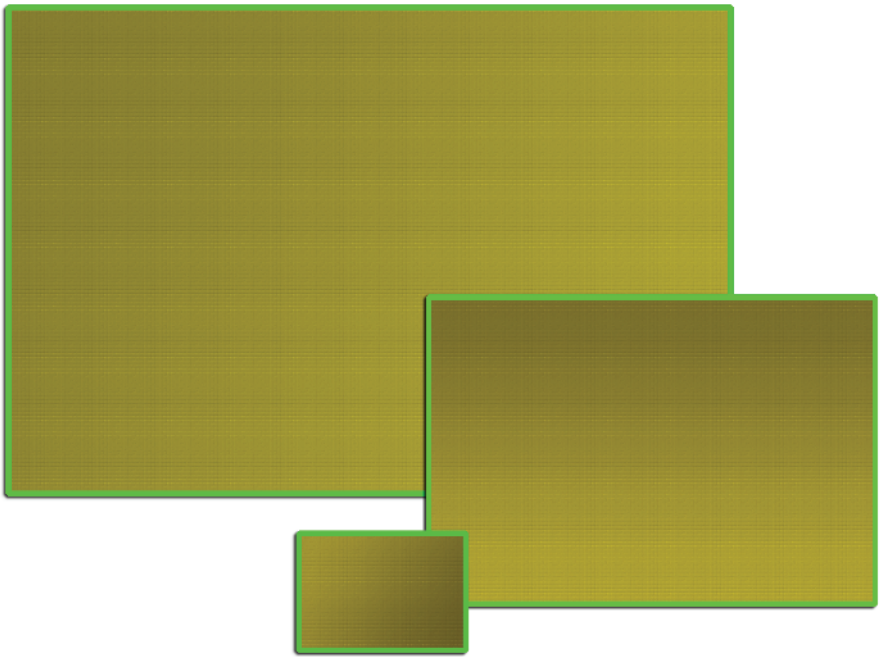

Figure 1-3: These images represent the comparative sizes of a dSLR's 24mm-x-36mm sensor (upper-left) and 22.2mm-x-14.8mm sensor (center), and a point-and-shoot digital camera's 7.8mm-x-5.32mm sensor (bottom).

If you think of a sensor as a rectangular bucket and the light falling on it as a soft drizzle of rain, the large buckets (or sensors) can collect more drops (or the particles of light called *photons*) more quickly than the small ones. Because a certain minimum number of photons is required to register a picture, a large sensor can collect the required amount more quickly, making it more sensitive than a smaller sensor under the same conditions.

In photography, the sensitivity to light is measured by using a yardstick called ISO (International Organization for Standardization). Most point-and-shoot digital cameras have a sensitivity range of about ISO 50 to ISO 100 (at the low end) up to a maximum of ISO 800 to ISO 3200 or 6400 (at the high end). Some point-and-shoot models have even higher sensitivity settings, but it remains to be

seen how useful these ultra-high ISO non-SLR models are. Indeed, many models that have high ISO settings generally don't do a very good job in terms of image quality, because their pixels are smaller and can't capture light as efficiently.

In contrast, digital SLRs — which have more sensitive sensors and larger light-gathering pixels — commonly have very usable ISO settings of up to at least ISO 1600 or ISO 3200. Many are capable of ISO 6400 or may range up to a lofty ISO 25600 (and up)! This extra speed does have a downside, as you can see in the following section. But, in general, the added sensitivity allows people to shoot photos in dim light, take action pictures, or stretch the amount of depth-of-field available and increase flash range.

Reducing noise in your photos

Visual noise (or just *noise*) is that grainy look that digital photos sometimes get, usually noticeable as multi-colored speckles most visible in the dark or shadow areas of an image. Although you can sometimes use noise as a creative effect, it generally destroys detail in your image and might limit how much you can enlarge a photo before the graininess becomes obtrusive.

The most common types of noise are produced at higher sensitivity settings. Cameras achieve the higher ISO numbers by amplifying the original electronic signal, and any background noise present in the signal is multiplied along with the image information. Figure 1-4 shows an image with a relatively low ISO value of 200 that's virtually free of noise and an image with a sensitivity of ISO 6400. The ISO 6400 sensitivity produces a lot more noise than the ISO 200 — even though someone took both pictures by using a digital SLR.

Point-and-shoot digicams often don't have ISO settings beyond ISO 6400 because the noise becomes excessive at higher ratings, sometimes even worse than you see in the bottom example in Figure 1-4. However, you can boost the information that the big dSLR sensors capture to high ISO settings with relatively low overall noise. I've used digital SLRs that had less noise at ISO 1600 than some poor-performing point-and-shoots displayed at ISO 400. Obviously, the large sensors in dSLRs score a slam-dunk in the noise department and make high ISO ratings feasible when you really, really need them.

Figure 1-4: A noise-free photo shot at ISO 200 (top); a noisy photo shot at ISO 6400 (bottom).

Noise doesn't always result simply from using high ISO settings: Long exposures can cause another kind of noise. Although some techniques can reduce the amount of noise present in a photo (as you discover in Chapter 2), by and large, digital SLR cameras are far superior to their non-SLR counterparts when it comes to smooth, noise-free images.

Thanks to the disparity in size alone, all sensors of a particular resolution are *not* created equal, and sensors that have fewer megapixels might actually be superior to high-resolution pixel-grabbers. For example, many older 12-megapixel dSLRs produce superior results compared to some of the newer 14-megapixel non-SLR digicams. So, no matter how many megapixels a point-and-shoot camera's sensor can hoard, that sensor generally isn't as big as a dSLR's. And when it comes to reducing noise, the size of the sensor is one of the most important factors.

Reclaiming depth-of-field control

Depth-of-field is the range over which components of your image are acceptably sharp. In general, you want to be able to control the amount of depth-of-field because having more or less depth-of-field gives you creative control over what's sharp and what isn't in your photos. You might prefer to zero in on a specific subject and let everything else remain blurry. Or you might want to have everything in your frame as sharp as possible.

To understand how dSLR cameras give you more control over depth-of-field, you need to understand the three factors that control this range, which I outline in Table 1-1.

Table 1-1 How Depth-of-Field Affects Photos

Factor	*How It Affects a Photo*
The distance between the camera and the subject	The closer your subject is to the camera, the greater the tendency for the objects in front or behind the subject to blur in the photo.
The size of the lens opening (the *f/stop* or *aperture*) used to take the picture	Larger f/stops (smaller numbers), such as f/2 or f/4, produce less depth-of-field than smaller f/stops (larger numbers), such as f/11 or f/16. *Remember:* The size of the numbers is reversed because apertures are actually the denominators of fractions, so ½ and ¼ are *larger* than $\frac{1}{11}$ or $\frac{1}{16}$.
The magnification (or *focal length*) of the lens	The shorter the focal length of the lens (say, 18mm or 20mm), the more depth-of-field is present. When the focal length grows longer (say, to 70mm or 100mm), the depth-of-field shrinks.

Point-and-shoot digital cameras offer very little control over depth-of-field because, unless you're shooting an extreme close-up, virtually everything is in sharp focus. The prodigious depth-of-field also makes it difficult to plan and visualize the range of focus as you view the image prior to exposure. This condition (which you may not like if you're trying to use focus selectively) occurs because non-SLR digital cameras that use tiny sensors also must have lenses of a much shorter true focal length. Smaller sensors require a shorter focal length to produce the same field of view.

So, a point-and-shoot digital camera might have a 7.5mm-to-22.5mm 3X zoom lens that provides a slightly-wide-angle-to-slightly-telephoto field of view. A digital SLR with the largest (24mm x 36mm) sensor might need a 35mm-to-105mm zoom to provide the same perspective.

Yet, depth-of-field is dependent on the *actual* focal length, not the equivalent. So, that point-and-shoot camera's lens, even at its longest telephoto position (22.5mm), provides more depth-of-field than the dSLR's same-perspective zoom at its widest angle. So much is in focus with a non-SLR digital camera that, in practice, you have very little control over depth-of-field, except when shooting close-up pictures from very short distances.

You can see the effect of using a large maximum aperture in Figure 1-5, which was shot at f/5.6 with a 200mm lens. Creative use of depth-of-field can isolate a subject effectively. In Chapter 6, I explain depth-of-field in more detail.

Figure 1-5: Using a large f/stop, you can easily isolate a subject with a creative application of blur.

Taking photos faster

Everything about a digital SLR seems to work more quickly and responsively. You may find that speed important when you want to make a grab shot on the spur of the moment or expect the camera to take an action photo *right now* when you press the shutter release at the peak moment. Many point-and-shoot digital cameras are downright slugs compared to dSLRs. (To be fair, though, vendors have worked very hard to close the gap, and the performance gap is much less than it was in years past.) With a dSLR, you find improved speed in three key areas, which I explain in the following sections.

Wake-up time

You can have a relatively fast non-SLR digicam powered up and ready to snap its first photo in as little as a second or two. Worse, because they consume so much power (thanks to the rear-panel LCD), these cameras may go into standby mode or shut off completely if you don't take a picture for 30 to 60 seconds.

When you flip the power switch of a dSLR, the camera is usually ready to take the picture before you can move the viewfinder up to your eye. Some dSLRs are ready to go in 0.2 of a second! Digital SLRs don't need to go to sleep, either, because they consume so little power when not in active use. I've left dSLRs switched on for days at a time with little perceptible draining of the battery (but not in Live View mode, which uses more juice). Certainly, the autofocus and auto-exposure mechanisms go on standby a few seconds after you move your finger from the shutter release, but you can have them available again instantly by giving the button a quick tap.

Shot-to-shot time

Conventional digital cameras have limits on how quickly you can take pictures in succession. Unless you're using the motor-drive-like burst mode, one shot every 1 to 2 seconds is about all you can expect. Even in burst mode, you're lucky to get much more than 1 to 3 frames per second for 5 to 11 shots, max. Some point-and-shoot cameras do allow you to fire off shots continuously for longer periods (in some cases, until the memory card is full!), but you don't find such speediness in the average entry-level digital snapshot camera.

But all digital SLRs have relatively large amounts of built-in memory that temporarily store each photo that you snap before the camera transfers it to your memory card at high speed. You can probably take pictures in single-shot mode as quickly as you can press the shutter release, and for at least 8 to 10 shots before a slight pause kicks in. If you use a fast dSLR that has some quality level settings, you can often keep taking pictures for as long as your finger (or memory card) holds out.

A dSLR's burst mode can typically capture 3 to 11 frames per second for 12 to 30 shots or more, depending on the speed of the camera, speed of the memory card, and the quality level you choose. Low quality (high compression) settings produce smaller images that the camera can write to the memory card quickly (see Figure 1-6). No common point-and-shoot camera comes anywhere close to that level of performance at full resolution, even though a few can shoot at sustained frame rates that allow you to produce movielike effects with your still images. Sony produces near-dSLR models that use a semi-transparent mirror instead of a flip-up mirror, which allows them to fire off shots at a 10 or more frames per second (fps) clip. However, these "SLT" (single lens translucent) cameras have an EVF (electronic viewfinder) rather than optical SLR viewfinder, so they are not true dSLRs. (See Chapter 2 talks in more detail about the types of viewing systems.)

Figure 1-6: Digital SLRs make shooting high-speed action sequences easy.

Shutter lag

In years past, the number one question I got from new digital photographers was "What can I do about shutter lag!?!" Digicam owners seem to really dislike their camera's *shutter lag* — the pause between the moment you click the shutter button and the moment the sensor captures a slightly different image. Some snapshot cameras are worse than others, of course, but you can still find many models available that produce a slight, but annoying, lag between pressing the button and taking the picture.

Technically, digital SLRs also experience shutter lag, but it's likely so brief — on the order of 0.1 to 0.2 of a second — that you never notice it. Of course, dSLRs have little shutter lag only *most* of the time. Point your lens at a difficult-to-focus subject, such as the sky, or try to take a photo under low light, and your speedy autofocus lens might hunt back and forth while you gnash your teeth in frustration. (You discover some ways around this problem in Chapter 10.)

A dSLR works like a camera

Another reason why digital SLRs have improved performance is that they're easier to use, so you, as the photographer, can work quickly while you shoot. The manufacturers configure most non-dSLR cameras for consumers who simply want to grab a quick snapshot, instead of investing some artistry in creating a photograph.

Moreover, point-and-shoot cameras tend to be designed by an engineer who did a really, really good job adding photo capabilities to the vendor's cell phone line last year, and who obviously *must* be the best choice to cobble

together a full-fledged digital camera. Indeed, the line between cell phone cameras and digital snapshot cameras is blurring all the time. (Now that iPhone, Android, and other smartphones are commonly furnished with *two* cameras — one front-facing and one rear-facing — it's likely that one day you'll be able to get only a few categories of cameras: cell phone-integrated point-and-shoot models and interchangeable lens cameras such as digital SLRs and mirrorless LCD/EVF models.)

Like cell phones, non-SLR digital cameras tend to have most of the controls tucked away out of sight in the menu system, where the average consumer never has to see them and where the photo enthusiast has to hunt for them.

Digital SLRs, on the other hand, are always designed by a team of engineers who have extensive photographic experience. They know which controls a photographer absolutely needs and which controls they can bury away in the menus because you access those controls only when setting up the camera and maybe once a month (if that) thereafter.

Digital SLR designers know that you don't want to go three levels deep into a menu to set the ISO sensitivity or adjust white (color) balance for the type of illumination that you're using. You want to press an ISO or a WB (white balance) key and dial in the setting without giving it much thought. Or, perhaps, you can press a "quick control" button to produce a screen of all the available settings. You don't want to wade through a tedious onscreen display to set frequently used controls like shutter speed or aperture. You want to adjust each with a dial or two. Nature intended that you zoom and manually focus your camera by twisting a ring on the lens, not by pressing a little lever and letting a motor adjust the lens at its own pace.

Simply having a camera that operates like a camera, rather than like a DVD player, makes your picture-taking much easier and faster.

Getting more lens flexibility

When you work with a non-SLR, you use the lens mounted on the camera. In the past, some models had add-on telephoto and wide-angle attachments. You can still find such accessories, but they tend to subtract a bit of sharpness, even while they change the camera's viewpoint.

So, point-and-shoot camera owners must decide at the time they buy the camera what kind of pictures they intend to shoot. If they want to take a lot of photos indoors or of architecture outdoors, they might need cameras that have the equivalent of an ultrawide-angle lens, which is still fairly rare among non-dSLR models. Perhaps a photographer wants to shoot sports, so he or she needs a very long lens. You can find those lenses available, especially with superzoom models, but not generally with cameras that also have wide-angle capabilities.

Digital SLR camera owners have fewer limitations. I own a 10mm-to-24mm zoom that's the equivalent of a 15mm-to-36mm wide-angle lens on a dSLR that has a sensor of less than full-frame size. (You can find out more about full-frame sensors and why lenses are measured in equivalents in Chapter 2.) Other lenses that I own cover every single focal length, up to 500mm (750mm equivalent). I have two lenses designed especially for close-up photography and others that have fast f/1.4 apertures, which are perfect for low-light sports shooting, concerts, parties indoors, and other subjects. I haven't come close to exhausting the possibilities, either: You can find longer and wider lenses than what I own, along with specialized optics that do tasks such as canceling sharpness-robbing vibration caused by a photographer's unsteady hand.

Owners of dSLR cameras don't have to mortgage their homes to buy these lenses, either. Camera vendors offer some very sharp-fixed focal length lenses (*prime* lenses) for around $100. You can find inexpensive 70mm-to-210mm zoom lenses for as little as $150 to $200. A versatile 28mm-to-200mm zoom that I bought a few years ago cost only $300. Because dSLRs can often use lenses designed for their film camera counterparts, you can find hundreds of inexpensive used lenses, too. If you have a non-dSLR, you frequently have to buy a new camera to expand your lens horizons. You can find out more about selecting lenses in Chapter 6.

Freeing yourself from image editors

Digital SLRs do more than change how you *take* pictures. They change how you *make* pictures, as well. Perhaps you're a seasoned image editor, accustomed to cropping images in Photoshop or Photoshop Elements to mimic the extreme telephoto perspective that your previous camera couldn't duplicate. You might have used an image editor's Zoom Blur feature because your digicam's zoom lens didn't zoom fast enough to allow you to create that effect in the camera, as shown in Figure 1-7. You've faked fish-eye lens effects because your camera didn't have a fish-eye lens, or you've manually added lens flare instead of trying to create the real thing.

Maybe you had to blur the background of your images in an image editor because your digital point-and-shoot camera always brought *everything* into sharp focus (an excellent trait when you *want* everything in focus, but not so great when you want to focus selectively for creative effects).

By using a dSLR, those limitations might be behind you now. A digital SLR can do a lot of tricks that you had to fake in Photoshop in the past. Image editors are still helpful for some tweaks, as you discover in Chapter 14.

Figure 1-7: Don't settle for fake zoom blur when you can have the real thing.

Where Did All Those Downsides Go?

Of course, the digital SLR isn't perfect — but it's getting close. In previous editions of this book, I had to include a section that explained in detail, several downsides to using these *Wundermaschinen,* which ranged from the annoying to the almost irrelevant. Today, each of those downsides has been virtually vanquished. I address them in decreasing order of concern (at least, for most photographers) in the following sections.

Lack or expense of superwide lenses: Vanquished!

Many high-end digital SLRs have sensors that are the same size as the 35mm film frame, so you don't have to calculate equivalency factors. A 200mm lens provides the same magnification on a full-frame dSLR as it did on a film camera. More importantly, a 16mm or 14mm superwide-angle lens retains the same wide field of view.

But more affordable digital SLRs have smaller-than-full-frame sensors (I talk more about the sensor-size issue in Chapter 2), so the sensor crops the field of view of any lens that you mount on the camera to match the smaller sensor size. The crop factor ranges from 1.3 to about 2.0 for the current, er, crop of digital SLRs. Therefore, in practice, a 100mm telephoto lens mounted

on one of these cameras has the same field of view as a longer 130mm-to-160mm telephoto lens on a 35mm film camera. Because you figure the effective field of view by multiplying the actual focal length by the crop factor, the figure is also sometimes called a *magnification factor*. But magnification factor isn't an accurate term because no magnification takes place. The camera simply crops out part of what the lens sees. Your 100mm lens might *look* like it's been magically transformed into a longer 160mm optic, but the depth-of-field and other characteristics remain the same as the 100mm lens it really is.

Photographers who shoot sports and distant subjects often love the crop factor, even though it gives them nothing they can't achieve just by cropping a full-size frame. The crop factor *seems* to provide a longer telephoto lens for the same money. The good news turns bad, however, when they mount 28mm wide-angle lenses on their beloved dSLRs and find that they have the same field of view as a 45mm standard (normal) lens, or that their favorite 18mm superwide lenses are now 29mm ordinary wide-angle optics. (I use a 1.6 crop factor, typical of Canon cameras, in all these examples.) In this case, you get a less wide view from a particular lens.

Fortunately, you can find plenty of true wide-angle lenses available for digital SLRs. Since the last edition of this book, the cost of those lenses has gone down, so any serious photographer can afford them. Three different vendors offer 12mm-to-24mm or 10mm-to-24mm superwide zooms for my favorite dSLR, making it possible to shoot expansive shots, such as the one shown in Figure 1-8. You can get focal lengths down to 8mm. If you want to shoot wide and have a dSLR that has a crop factor, you can find lenses that provide you with the wide-angle view you crave.

Figure 1-8: You can take panorama-like shots by using an ultra-wide-angle lens.

And remember, most of these lenses are *considerably* wider than the (current) widest-angle optics available for point-and-shoot cameras, which seem to get no wider than the equivalent of 24–28mm with a traditional film camera.

Fending off dirt and dust: Automatic!

For some dSLR owners, the worst of the camera's downsides is the plethora of dust bunnies and odd particles of matter that seem to attach themselves to the camera's sensor at every opportunity. Fortunately, virtually every digital SLR introduced in the last few years includes a sensor-shaking device that vibrates when the camera is powered up, turned off, or whenever you specify to remove these artifacts before they can show up in your photos. Some vendors apply antistatic coatings to keep the dust from sticking to your sensor and include a sticky-strip in the sensor chamber to capture the dust that's dislodged by the cleaning process.

Even so, take extra care when changing lenses to keep dust from wending its way back to the sensor area (which is fully exposed only when you're taking a picture, anyway). Also, find out how to manually clean this dust off your sensor, a process that's much easier to do than it is to describe. I go into the details of sensor cleaning in Chapter 5.

Some photographers have problems with dust seemingly on a weekly basis. Others go months without any infiltrations. If your camera has a sensor-cleaning feature, dirt and dust and digital SLRs might be a very small problem for you. But this problem might loom large, depending on your working habits, cleanliness, and willingness to stomp out a few artifacts from time to time in your image editor.

LCD preview: Live, and in person!

Non-SLR digital cameras have always been able to offer a live preview of the image, as seen by the sensor, prior to exposure. At one time, almost all dSLRs couldn't offer such a preview because the mirror that provides the optical view of the subject, which flips up just prior to exposure, is in the viewing path. However, virtually all current digital SLR cameras use various technologies to provide a Live View preview.

Use a digital SLR's larger optical viewfinder if you want to judge composition and depth-of-field and to frame fast-moving action, and use the Live View when it suits you and the LCD screen isn't washed out from bright sunlight. The following sections cover the key applications that *do* benefit from an LCD preview.

Live histograms in real time

A *histogram* is a graph that displays the tonal range of an image. You can use a histogram to judge whether a photograph is or will be under- or overexposed. The trained eye can also see whether an image is likely to have excessive contrast or look particularly flat, based on the distribution of tones in a histogram.

You can make adjustments to lighting and exposure to improve the rendition of a shot. Prior to Live View, you could view dSLR histograms only after the fact, when you reviewed the photo you already took. The digital SLR owner who has live histogram capabilities can make adjustments before taking the next picture. You can find more about the use of histograms in Chapter 8.

Déjà view with extended eye-points

The *eye-point* is the distance that you can move your eye away from the viewfinder and still see the entire image for framing. An extended eye-point is useful for sports and other applications where you want to keep an eye on what's happening outside the camera's viewfinder.

A live LCD preview lets you keep the camera a few inches from your face, or even at arm's length, and still see what the camera will capture. Point-and-shoot digital cameras and many dSLRs from Nikon, Canon, and other vendors (including the model shown in Figure 1-9), put the LCD on a swiveling mount so that you can use it for framing while you hold the camera at waist level, overhead, or with some models, even facing you for a self-portrait.

Figure 1-9: Live View and a swiveling LCD are a perfect combination for framing shots from any angle.

Infrared imagery not up to your imagination

Infrared photos call for a filter that blocks visible light. All you see through the optical viewfinder is a vast expanse of black, which makes framing your photo difficult. A live LCD preview gives you *some* type of image, at least.

Although this problem is annoying, you can work around it. Most people don't shoot infrared photos at all. A few dedicated souls convert an extra dSLR for full-time infrared use, so they don't need a visible-light-blocking infrared filter. Those photographers who do shoot infrared with their

unmodified cameras find that exposures are so long, they need a tripod. If you fall into this camp, you have two options:

- Set up your camera on a tripod, frame your picture, and *then* mount the infrared filter.
- Frame the photo as best you can (by using Live View, if available), take a shot, and then use the after-shot LCD review to make adjustments.

Carrying that weight: Heft not mandatory!

Many digital SLRs are much bigger, heavier, and clunkier than pocket-sized point-and-shoot digital cameras. Fortunately, camera manufacturers have recognized the appeal of smaller dSLRs, so you can find relatively small models from many vendors. If all you want is an interchangeable lens camera and don't need a dSLR, you can go even smaller with mirrorless models from Sony, Canon, Nikon, Olympus, and Panasonic.

Of course, the more money you spend on a dSLR, the bigger it likely is because vendors offer magnesium alloy bodies, rather than the composite plastic used for entry-level digital SLRs. Tack on extra battery packs and special grips that let you shoot more comfortably in a vertical position, and the camera becomes even larger.

This size problem is an annoyance only to someone who needs to travel light. For most photographers, the whole point of upgrading to a digital SLR is to gain access to the extra lenses and accessories that these cameras can use. The extra heft is part of the cost of the greater versatility. Many dSLR owners also purchase small point-and-shoot cameras to carry when weight and size are important to them.

In my case, I often use a compact version of my "big" dSLR as a backup when I'm traveling. I fully intend to take all my photos by using my hefty main camera, but I'd hate to be without any camera at all in case of a mishap. So, the compact dSLR from the same manufacturer goes in the bag, too, as backup.

In-camera editing!

Newer digital SLRs now give you the ability to do some simple editing right in the camera by using a Retouch menu or other facility. Here are some of the benefits of this capability:

- **Correct your images without a computer.** Correct colors, change tonal values to improve the brightness or darkness of your image, fix red-eye, straighten crooked shots — all in the camera and without the need of a computer. You may find this capability handy when you want to fix your shots and then email them while you're on the run.

- **Create small copies for web display or emailing.** You don't want to send a 16-megapixel (or larger) file home while you're traveling. Such an image might overtax your connection when you're on the road and could cause trouble for the person trying to view it. The latest dSLRs let you trim, crop, and output a lower-resolution version of your best shots for easier Internet distribution.
- **Apply special effects.** Convert your image to black-and-white. Add filter effects. Combine two shots by using overlay techniques. Add or remove distorting effects. Create a fish-eye shot without the need for a fish-eye lens. Produce those cute "miniature/shift-tilt" effects. You can find these capabilities in several different dSLR models.