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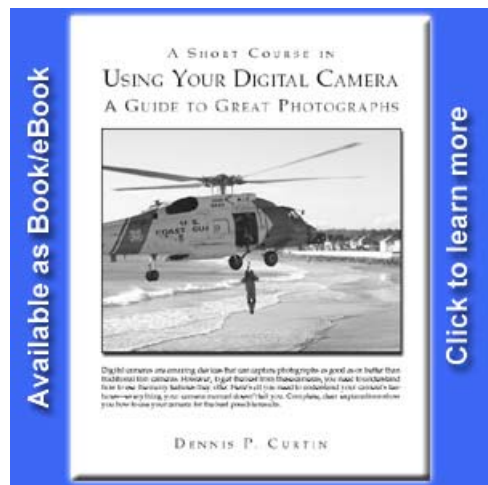
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## A Short Course in Using Your Digital Camera

### 3. Fine Tuning Exposure



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Automatic exposure control is one of the most useful features of your camera. The convenience of having the camera automatically measure the brightness of the light, then set the correct shutter speed and aperture will be particularly evident to you if you have ever used a camera that did not function automatically in that way. It means you can often let the camera deal with the exposure while you concentrate on the image. This is especially helpful when photographing action scenes where there isn't time to evaluate the situation and then set the controls manually.

You shouldn't, however, always leave the exposure to the automatic system. Automatic exposure works well in most, but not all, lighting conditions. At times the lighting can fool any automatic exposure system into producing an underexposed (too dark) or overexposed (too light) image. Although you can make adjustments to a poorly exposed image in a photo-editing program, you've lost image information in the shadows or highlights that can't be recovered. You will find it better in some situations to override the automatic exposure system at the time you take the picture.

Typical situations in which you might want to override automatic exposure include interesting and unusual lighting situation. For example, if you want to photograph into the sun, record a colorful sunset, show the brilliance of a snow-covered landscape, or convey the dark moodiness of a forest, you will probably need to adjust exposure, rather than let the camera make exposure settings automatically.



#### How Your Meter Works

All light meters, including the one built into your digital camera, operate on the same general principles. A light-sensitive photocell regulates the amount of electricity flowing in the metering system. As the intensity of the light reflected from the subject changes, the amount of electricity flowing through the photocell's circuits changes and is used by the autoexposure system to calculate and set the shutter speed and aperture.

Your camera's meter measures light reflecting from the part of the scene shown in the viewfinder or on the LCD panel. The coverage of the meter (the amount of the scene that it

includes in its reading) changes just as your viewfinder image changes, when you change your distance relative to the scene or when you zoom the lens. Suppose you move close or zoom in and see in your viewfinder only a detail in the scene, one that is darker or lighter than other objects nearby: the suggested aperture and shutter speed settings will be different than if you meter the scene overall from farther away.

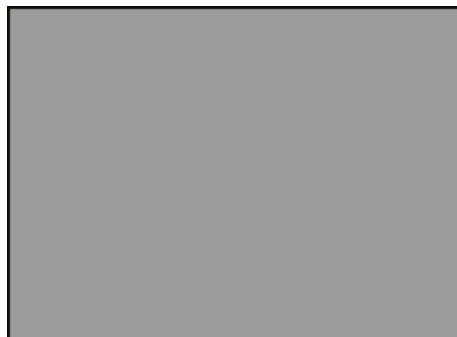
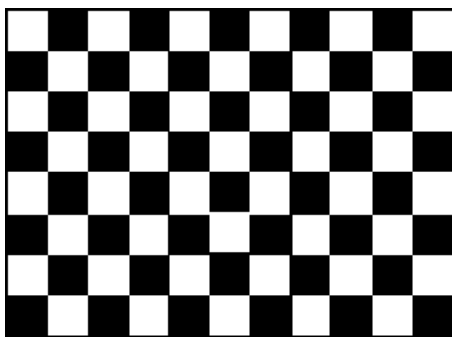
### Meter averaging and middle gray

Your exposure meter doesn't "see" a scene the same way you see it. Its view is much like yours would be if you were looking through a piece of frosted glass.



*Your meter sees scenes as if it were looking at them through a piece of frosted glass. It doesn't see details, just averages.*

Every scene you photograph is something like a checker board (below), but even more complex. Portions of it are pure black, pure white, and every possible tone in between. Regardless of the elements making up the scene, your camera's meter can average and measure brightness only.



*Where you see a black and white checkerboard (left), your camera sees only an average gray (right).*

The exposure meter and exposure control system in an automatic camera can't think. They do exactly what they are designed to do and they are designed to do only one thing. Regardless of the scene, its subject matter, color, brightness, or composition, the meter measures the overall amount of light reflecting from the scene. Since the light meter measures only brightness (how light or dark the scene is) and not color, the automatic exposure system then calculates and sets the aperture and the shutter speed to render this level of light as "middle gray" in the photograph. Most of the time this works very well because most scenes have an overall reflectance that average out to middle gray. But some scenes and situations don't average out to middle gray and that's when autoexposure will lead you astray.

A continuous spectrum of tones, ranging from pure black at one end to pure white at the other is contained in most scenes. In simple terms, this continuous scale can be thought of as dividing into a series of individual tones called a gray scale. Each of the tones in this scale has received 1 stop more exposure than the next darkest tone in the series, and one stop less exposure than the next lightest tone. The tone in the middle is called middle gray. A subject uniformly of this tone reflects exactly 18% of the light falling on it.



*The gray scale is a series of steps reflecting different levels of brightness.*

When you photograph a subject with an overall tone of middle gray, your camera's autoexposure system will set an exposure so that the subject will appear in the final image as middle gray. When you photograph subjects that have an overall tone lighter or darker than middle gray they will also be middle gray in the final image and therefore look too light or dark. As a result, if you photograph first a white card, then a gray card, and third a black card, and each completely fills the viewfinder frame when the exposure is calculated, each of the cards will be middle gray in the captured image.



*The gray scale is hard to see when looking at a scene in color.*



*It takes practice, but you can learn to see the way your camera does, in shades of gray.*

To make scenes that don't average out to middle gray appear in an image the way they appear in real life, you have to use exposure compensation or some other form of exposure control to lighten or darken the picture.

### Types of metering

All parts of a scene are usually not equally important when determining the best exposure to use. In a landscape, for instance, the exposure of the foreground is usually more important than the exposure of the sky. For this reason some cameras offer more than one metering method. The choices might include the following:

- **Matrix** metering divides the image area into a grid and compares the measurements against a library of typical compositions to select the best possible exposure for the scene.

- **Center-weighted** meters the entire scene but assigns the most importance to the center quarter of the frame where the most important objects usually are located.
- **Bottom-weighted** meters the entire scene but assigns the most importance to the bottom of the frame where the most important objects usually are located.
- **Spot** evaluates only the area within a small area in the middle of the viewfinder. This allows you to meter just a specific part of the scene instead of relying on an average reading. This mode is ideal when photographing a subject against a bright or dark background.



*In this image, automatic exposure worked well because the scene averages out to middle gray.*

Meter weighting can cause a few problems. For instance, a dark object located off center against a very light background may not be exposed properly because it is not located in the area the meter is emphasizing. Or, in some cases, holding the camera vertically may give undue emphasis to one side of the scene. These occasions are uncommon, but when they occur you can ensure accurate readings and exposure settings by metering the subject from close-up. The camera settings can then be overridden if necessary to produce a well-exposed photograph.

#### **How To: Changing the Metering Mode**

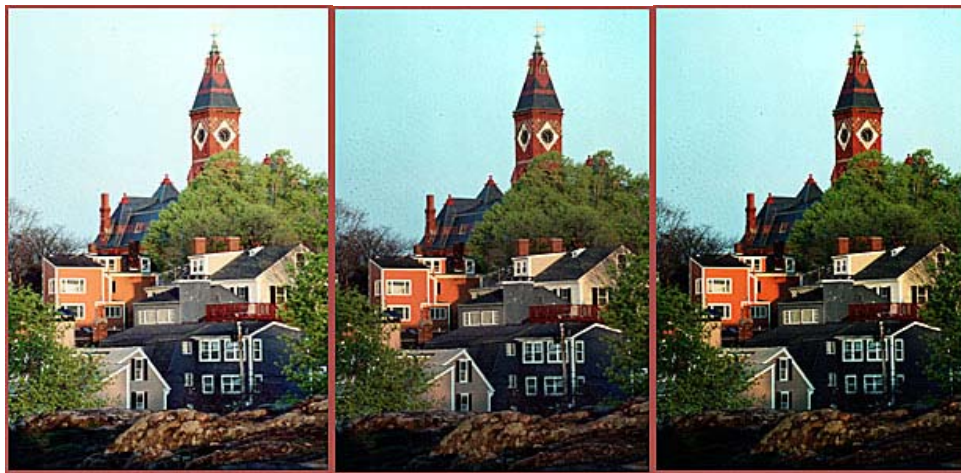
Look in your camera manual for a section on **metering methods** or **spot metering**.

### **How Exposure Affects Your Images**

When you take a photograph, the exposure isn't uniformly distributed over the sensor's surface—unless you are photographing a subject that is absolutely uniform in tone. Highlights (brighter areas) in the scene reflect the most light, and the areas of the sensor onto which they are focused are exposed a great deal. Darker areas, like shadows, reflect much less light, so the areas of the sensor onto which they are focused receive much less exposure. The perfect exposure retains details in both the highlights and shadows. For the autoexposure system, this is as difficult as your parking a very large car in a very small garage. If there is even a little too much exposure, the image is too light and details are lost in the highlights. If there is too little exposure the image is too dark and details are lost in the shadows.

One way to ensure you get the best exposure is to take three pictures. The first would be at the recommended setting. The second would be lighter and the third darker than the original one. This process is referred to as bracketing because you're bracketing the suggested exposure. You can do this using exposure compensation.





*In this series of photographs you can see the effect of exposure on the image. The middle photo is correctly exposed. The left photograph was overexposed and is too light. The right photo was underexposed and is too dark.*

### When Automatic Exposure Works Well

Most scenes that you photograph have an overall brightness of middle gray. Some areas of the scene may reflect 90% of the light and other parts may reflect 5%, but overall the average amount of light reflecting from the scene is 18%, the amount reflected by a middle gray subject.

Whenever you photograph a normal scene with this average brightness, your automatic exposure system exposes it correctly. Typical middle gray scenes include the following:

- Scenes in bright sunlight where the subject is front-lit by a sun that is behind you when you face the scene.
- Scenes on overcast days or under diffused light, such as in the shade or in evenly lit scenes indoors.



*This image has detail in the lightest (highlight) and darkest (shadow) areas. If just a little darker or a little lighter details would be lost in the shadows or highlights.*

#### How To: Taking a Picture in Automatic Mode

1. Turn the camera on and set it to automatic mode. Be sure to remove the lens cap.
2. Compose the image in the viewfinder making sure the subject that you want sharpest is in the focus area in the center of the viewfinder.
3. Press the shutter-release button halfway down so the camera can set focus, exposure, and white balance. When the camera has done so, a lamp may glow or the camera may beep.

4. Press the shutter-release button all the way down to take the picture. When you do so, the camera may beep. The camera then saves the new image onto the camera's flash card.
5. When done, turn the camera off.

### When to Override Automatic Exposure

Let's take a look at some of the most common situations where your automatic exposure system will have problems. It's in these situations where you'll need to override the suggested exposure settings.

#### Scenes lighter than middle gray

Scenes lighter than middle gray, such as beach scenes, or bright sand or snow covered landscapes, reflect more than 18% of the light falling on them. The autoexposure system doesn't know the scene should look bright so it calculates an exposure that produces an image that is too dark. To lighten the image so it matches the original scene, you must override the camera's automatic exposure system to add exposure.



*The snow scene here is typical of scenes that are lighter than middle gray. Most of the important tones in the scene are at the lighter end of the gray scale. The overall "average" tone would be about one stop brighter than middle gray. For a good picture you have to increase the exposure by one stop (+1) to lighten it. If you didn't do this, the snow in the scene would appear too gray (bottom).*



#### Scenes darker than middle gray

Scenes that are darker than middle gray, such as deep shadows, dark foliage, and black cloth, reflect less than 18% of the light falling on them. Although such scenes are not as common as scenes lighter than middle gray, you will come across them occasionally. If you photograph such scenes using automatic exposure, they will appear too light. The meter cannot tell if the scene is dark or just an ordinary scene with less light falling on it. In either case it increases the exposure to make the scene lighter. When it does this, it overexposes the image and makes it too light. To produce a picture with an overall tone darker than middle gray, you need to override the autoexposure system to decrease the exposure to make it darker.



*The black cat is between one and two stops darker than middle gray. To darken the scene so the cat's not middle gray, exposure must be decreased by one (-1) or two (-2) stops.*

### Subject against very light background

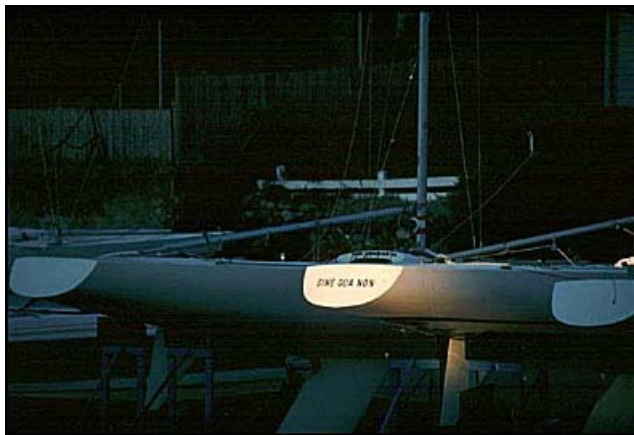
Subjects against a very light background such as a portrait against a bright sky or light sand or snow, can confuse an automatic exposure system, particularly if the subject occupies a relatively small part of the scene. The brightness of the background is so predominant that the automatic exposure system reduces the exposure to render the overall brightness as a middle gray. The result is an underexposed and too-dark main subject.



*Here the scene was underexposed to silhouette the people in the foreground. To show detail in the people, exposure would have had to have been increased two stops (+2).*

### Subject against very dark background

When a small light subject appears against a large dark background, your autoexposure system assumes the overall tone to be darker than it actually is, because so much of the scene is dark compared to the smaller brighter main subject. The autoexposure system increases the exposure to produce a middle tone. The result is an overexposed and too light main subject.



*The rising sun illuminated only one boat in this harbor scene. If the exposure hadn't been reduced by two stops (-2), the background would be too light and the white boat would have been burned out and too white. A scene like this is a great place to use spot metering.*



### Scenes with high contrast

Many scenes, especially those with brightly lit highlights and deep shadows, have a brightness range that cannot be completely recorded on an image sensor. When confronted with such scenes, you have to decide whether the highlight or shadow area is most important, then set the exposure so that area is shown accurately in the final picture. In high contrast situations such as these, move close enough so the most important area fills the viewfinder frame. Use exposure lock from that position to lock in the exposure. Another way to deal with high contrast is to lighten the shadows by adding fill flash. A portrait, for example, lit from the back or side is often more effective and interesting than one lit from the front. But when the light on the scene is contrasty, too much of the person's face may be in overly dark shadow. In this case use fill flash or a white reflector card to fill and lighten the shadows.

#### Tip

In high contrast settings, some cameras let you decrease contrast at the time you take the picture.



*The archway was in the shadows and dark while the cathedral was brightly lit by the sun. Both couldn't be exposed properly, so the archway was left as a solid black.*

### Hard to meter scenes

Occasionally it's not convenient or even possible to meter a scene. Neon street signs, spot lit circus acts, fireworks, moonlit scenes, and many similar situations are all difficult and sometimes impossible to meter. In these cases, it's easiest simply to experiment, using the exposure compensation control on your camera. After taking a picture at the suggested exposure, you use exposure compensation to take other exposures both lighter and darker than the suggested settings.





*This scene has a bright sky and one brightly illuminated fisherman against a dark background. A scene such as this is hard to meter because of the variety of lighting.*



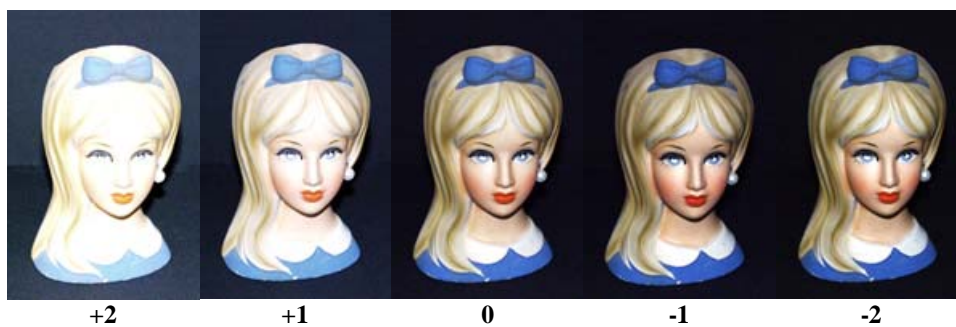
*A relatively small subject against a wide expanse of sky will almost always be underexposed unless you use exposure compensation.*

### How to Override Automatic Exposure

Most digital cameras provide one or more ways to override the automatic exposure system to get the exposure you want.

#### Exposure compensation

Exposure compensation lets you lighten or darken the photograph that the camera would produce if operated automatically. To lighten a picture, you increase the exposure; to darken one, you decrease the exposure. The amount you increase or decrease the exposure is specified in "stops." For example, to increase the exposure 1 stop, you specify +1 to open the aperture or slow down the shutter speed. It's easy to use exposure compensation because you can preview your changes on the LCD monitor.



To make changes to exposure, you use exposure compensation control where you can often increase or decrease exposure by two stops in one-third stop increments. Here are some typical settings where you'd make these changes.

- **+2** is used when the light is extremely contrasty and important shadow areas are much darker than brightly lit areas.

- **+1** is best for sidelit or backlit scenes, beach or snow scenes, sunsets and other scenes that include a bright light source, or very light objects, such as a white cat on a white pillow.
- **0** (the default) is best for scenes that are evenly lit and when important shadow areas are not too much darker than brightly lit areas.
- **-1** is for scenes where the background is much darker than the subject, such as a portrait in front of a very dark wall. Also good for very dark objects, such as a black cat on a black pillow.
- **-2** is for scenes of unusual contrast, as when an extremely dark background occupies a very large part of the image and you want to retain detail in the brighter parts of the scene.

**Tip**

Use + exposure compensation when the subject is bright and - when it's dark.

**How To: Using Exposure Compensation**

Look in your camera manual for a section on exposure compensation. Many cameras let you select a setting from -2 to +2 stops in increments of 1/3 of a stop. The LCD monitor will display the result of the changes. If you select a + value, the scene will look brighter. If you select a - value it will look darker. \*

**Exposure lock**

Just as you can point the camera at an object and press the shutter-release button halfway down to lock in focus, so you can with exposure. For example, with a gray barn sitting in a white snow-covered field, you can use spot metering or move closer to meter just the barn and hold down the shutter-release button to lock in that reading. You can continue holding the button half way down and recompose the picture using the locked in exposure and focus setting.

**How To: Using Exposure Lock**

1. Point the camera so the subject that you want to lock exposure on is in the focus area in the center of the viewfinder.
2. Press the shutter-release button down halfway and hold it there to lock in the exposure.
3. Without releasing the shutter-release button, recompose the scene and press the shutter-release button the rest of the way to take the picture.

**Controlling Brightness and Contrast**

Some cameras let you adjust the contrast and brightness in your photographs; also referred to as adjusting the tone curve. To visualize the effects these controls can have, adjust the brightness and contrast settings on your TV or computer monitor. Some cameras allow you to adjust brightness and contrast at the time you take a picture. With others, you can only do it later using a photo-editing program.

**Brightness**

Brightness raises or lowers the brightness of the entire scene to make everything lighter or darker.



*Decreasing brightness darkens an image (left) while increasing it lightens it (right).*

### Contrast

Contrast adjusts the differences between the brightest and darkest areas in the image. You can increase or decrease the contrast.



*Decreasing contrast makes colors in the image look more muted and "flatter" (left) while increasing it makes it look sharper and crisper (right).*

#### How To: Adjusting Brightness and Contrast

Look in your camera manual for sections on brightness, contrast, or tone curves.

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