Photoshop Elements 3 – More Improvements

White Balance

Most light sources are not 100% white, but have different colors. Colors are classified in terms of temperature – red is “cooler” and blue is “hotter.” (Black-body radiation, if you have taken a physics course)

<table>
<thead>
<tr>
<th>Light</th>
<th>Color Temperature (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candle flame</td>
<td>1,500</td>
</tr>
<tr>
<td>Incandescent bulb</td>
<td>3,000</td>
</tr>
<tr>
<td>Sunrise or sunset</td>
<td>3,500</td>
</tr>
<tr>
<td>Midday sun or flash</td>
<td>5,500</td>
</tr>
<tr>
<td>Bright sun or clear sky</td>
<td>6,000</td>
</tr>
<tr>
<td>Cloudy sky or shade</td>
<td>7,000</td>
</tr>
<tr>
<td>Blue sky</td>
<td>9,000</td>
</tr>
</tbody>
</table>

Our brains compensate for different lighting conditions, so we see white objects as “white” no matter what the lighting actually is. Camera sensors, on the other hand, record what colors actually strike them. Thus a picture of a white egg will appear slightly yellow if the egg was illuminated by an incandescent light bulb and slightly green if illuminated by fluorescent lighting.

In the days of film photography, photographers would choose film that matched the lighting conditions (e.g., “indoor” film for incandescent lights) so that objects in their pictures would appear the proper colors. Digital cameras handle different lighting conditions in a different way – the **white balance** setting, which gives you the option of telling the camera what the lighting conditions are. Typical white balance settings are sunlight, cloudy, fluorescent, incandescent, etc. Most digital cameras also have an Automatic White Balance setting that chooses the best-fit white balance based on the overall color of image. The white balance setting you use is a matter of choice. I frequently leave mine set on “cloudy,” which produces slightly warmer images.

Many digital cameras also allow you to set the white balance manually. You can buy a high quality white or gray card (usually called a “gray card”) at any photographic store. If you are photographing a scene that has obvious white balance problems (difficult lighting, no white object in the picture, etc.) you can point the camera at the card, filling the screen completely with the card, and then press the White Balance button. The camera will automatically calculate the white balance for this particular lighting, which you can save and use for your photographs.

Unfortunately, the white balance setting you use sometime does not turn out to be appropriate for a given lighting situation in spite of your best efforts. In this case, the colors in an image may not match what we see with our eyes and what we expect to see in the picture. Luckily we can use Photoshop Elements to correct colors in an image to make them more pleasing.
Auto Color Correction

Open OlinTheater.jpg and save it as OlinTheater_1.psd.

The easiest way to correct colors is to use Auto Color Correction. Usually I do not think it is a good idea to rely on the automatic features offered by Photoshop Elements because we can do a better job ourselves. On the other hand, I have found Auto Color Correction to be fairly reliable.

Select Enhance, Auto Color Correction from the main menu. How does this change the colors in the picture? Do you like them better?

Removing a Small Object from a Picture

At one time or another we all have taken a picture that would be improved by removing a small object. Open the picture named Steps.jpg and save it as a Photoshop file, Steps_1.psd.

If our main interest is the building and the surrounding foliage, there are two unimportant and distracting objects in the picture – the sunbather and the top of the sundial (at the bottom of the picture) – that we would like to remove.
Let's remove the sunbather first. Zoom in on the image to focus in on the sunbather.

Elements has a very handy tool, the **Clone Stamp Tool**, which makes it easy to remove small objects from a regular background that does not have much detail. Click on this tool in the Toolbox.

Choose a soft brush that is somewhat large than the narrow section of the girl’s body – I chose 35 pixels. Make sure that Aligned is not checked.

We are going to sample a portion of the lawn and then “clone” it over the sunbather. This is a two-part process:

1. Choose a sample of the lawn.
2. Cover the sunbather with the sample.

When you move the cursor over the image, you should see a small circle that identifies the area that will be sampled. Move the cursor to a point on the grass somewhere below the sunbather.

Press the **Alt** key and click the left mouse button to collect the sample. Release the **Alt** key.
Click the cursor two or three times over the girl’s feet, which will be replaced by the sample of grass you collected.

With the **Alt** key depressed, click below the girl’s body again to sample another picture of the grass. Then click over the body again to remove more of it.

And again.

Continue removing the sunbather until only the top of the person’s head remains.

The clone stamp is not going to be as effective in removing the top of the head. We will complete the removal with the Pencil tool.
Selecting a Particular Color from a Picture

Choose the Eyedropper Tool from the Toolbox.

Point the eyedropper at a pixel on the steps close to the head and click the left mouse button. This sets the Foreground Color to the color of this pixel.

Changing the Color of a Small Section of a Picture

Choose the Pencil Tool.

You may need to set the size (how large is the pencil mark) and opacity (how dense the mark is) of the tool.

Size is measured in pixels – the small dots on the screen that make up the picture. The smallest size is 1 pixel.

Opacity is measured in percent. The higher the percentage the more opaque is the pencil mark. If opacity is set at 100%, the pencil mark will completely replace the current color on a pixel.

Set the Size to 1 pixel and the Opacity to 100%.
Click on the same row of pixels from which you sampled with the Eyedropper Tool to set the Foreground Color. As you click on each pixel, the Pencil Tool will change the pixel’s color to match the sample.

Repeat this process with other step colors until you have removed the head.

Remove the top of the sundial using the Clone Stamp Tool.

*Save the image with the name Steps2.psd*. We will use it in a later lesson.

**Reducing the Actual Size of a Picture**

Digital photographs from a multi-megapixel camera that is set on maximum resolution can take up quite a bit of storage space – the image we worked with in the first lesson, Old_Main.jpg, is over one MB in size, for example. Large files such as these give high quality photographic prints, but can cause problems if you try to send them over the Internet as attachments to email messages. It doesn’t take many 1 MB images to swamp an email mailbox. A large image also can make a web page very slow to load. If you want to send a large digital picture over the Internet or use it in a web page, you first must reduce its size.
Open the original **Old_Main.jpg** file and save it as a Photoshop file with the name **Old_MainResize.psd**.

The image may not look large on the Elements screen because it may be displayed in reduced form (33% in this example), but it is. You can Zoom to 100% if you want to see the full size of the image.

Choose **Image, Resize, Image Size** from the main menu.

Let’s reduce the actual size of this image to 640x480 pixels, which is a small enough size that it won’t give you problems if you want to send the image over the Internet.

Make sure that **Resample Image** is checked.

Enter **640 pixels** as the **Width** and **480 pixels** as the **Height**. Click on **OK**.

If you look at the image at full size (100%) on the screen, you will see that it is considerably smaller.

Save the file again as **Old_MainResize1.psd**.
Sharpening an Image

Digital cameras usually do not produce images as crisp as film cameras. Also, if you change the actual size of a picture, pixels either are added or removed from the image file, which generally makes the picture slightly fuzzy. In either case, we can use the **Unsharp Mask** filter to make the image crisper.

**Zoom the image to 100%. It is important to be looking at the true size of an image when you sharpen it.**

Position the picture at the left of the screen. Choose **Filter, Sharpen, Unsharp Mask** from the main menu.

To help understand how the Unsharp Mask works, I have magnified the picture of Old Main by 1200%, as shown in the illustration at the right of the peak of the portico roof. Each tiny square in the magnified image is a “pixel” – one of the colored points that make up the entire image.

A region in which there are pixels of one color on one side and another color on another side is an “edge.”

The Unsharp Mask increases the amount of contrast between pixels on either side of an edge.

The illustration at the right shows the same picture after the Unsharp Mask has been applied at a fairly high level. Notice that the pixels on the “dark” side of the edge are now even darker and the pixels on the “light” side of the edge are even lighter.

The increase in contrast emphasizes the edges and makes the picture appear sharper.
Position the Unsharp Mask dialog box so that you can see both the picture and the dialog box on the screen.

You can adjust the Amount, that Radius, and the Threshold of the Unsharp Mask:

- **Amount**: This determines the amount of contrast on either side of the edge. The higher the amount the more the contrast. My experience is that a large image fresh out of the camera (2000 x 1500 pixels or more) requires a higher Amount (around 150%). A smaller reduced image (640 x 480 pixels) requires a lower Amount (50 – 100%)
- **Radius**: This determines the number of pixels to sharpen around the edges. A radius between 1 and 2 is recommended.
- **Threshold**: This determines how different a set of pixels must be before they are considered to be part of an edge. A threshold value of around 10-15 levels is probably best so that the sky and skin tone areas will not be sharpened, which would make them appear blotchy.

The values you choose will depend on the size and resolution of the image with which you are working and on your taste. Beware of over-sharpening a picture, though. If you see white borders at the boundary between a dark and light region, such as in the picture at the right, you probably have sharpened the picture too much.
When you have sharpened the image, save the file as a .jpg again, Old_MainResize.jpg.

You will be asked about the quality of the image you want to save – the higher the quality, the larger the image. In this case, a **Medium Quality** image might be appropriate so that the file will not be too large.

This reduces the 1.05 MB (1050 kB) image down to around 94 kB. You can send files of this size as attachments to an email message without problems.

**Hue and Saturation**

Photoshop Elements uses **additive colors**, in which the three primary colors (red, green, a blue) combine to form white\(^1\). Although we can describe the color of light by the amount of red, green, and blue present, it also is helpful to use two other terms – hue and saturation.

- **Hue** is the dominant color in the light
- **Saturation** is the purity of the dominant color.

Usually the hue and the saturation of a colored object are fairly obvious. The **hue** is what we generally think of as being the “color” of an object. The **saturation** depends on the purity of the dominant color. If only one color is present, then the color of the object is saturated, but if several colors are present they combine to produce a color that is closer to white and hence is less saturated. **We often think of saturated colors as being strong, vivid, intense, or deep. On the other hand, undersaturated colors are thought of as weak, pale, washed out, or dull.**

Open **Roses.jpg**, a picture of a few red roses.

Look below at the plots of intensity vs. wavelength for light that roughly corresponds to two different roses, labeled #1 and #2 in the picture.

The **hue** of both roses is red because this is the dominant color in the light from both flowers.

On the other hand, the **saturation** of the two flowers’ colors is different.

- *Rose #1 is more highly saturated.* The wavelength plot for this rose has a very narrow peak, so all of the light coming from this flower is nearly the same (we say it is “pure red.”) The result is a flower that is a vivid deep red.

- *Rose #2 is more unsaturated.* The red peak in the wavelength plot for this rose is wider. We also see a small peak in the green region and a somewhat larger one in the blue. The green and blue light combine with the dominant red to give a color that is closer to white than pure red. Hence, the color of light coming from this flower is paler and less vivid – we probably would say that it is pink.

Specifying the hue, saturation, and brightness of a color is an alternative to the RGB (red, green, blue) method of describing a color.

Select the **eyedropper tool** from the toolbox and click somewhere on rose #1 directly below the arrow. This will select the color of the pixel on which you click.
Now click on the **Foreground Color** box at the bottom of the toolbox.

This will display the **Color Picker** window with information about the color of the pixel you selected with the eyedropper tool.

In the color picker window, notice that the color is represented in two different ways in the six small rectangles labeled H, S, B, R, G, and B.

Look first at the bottom three:

- **R**: 170 (The tonal value of the red channel)
- **G**: 0 (The tonal value of the green channel)
- **B**: 22 (The tonal value of the blue channel)

The tonal values for R, G, and B each can vary between 0 and 255, where 0 means no color and 255 means the most intense. We can see from the three values above that the Red is intense and the other two are weak. The color obviously is red.

The top three (H, S, and B) specify the Hue, Saturation, and Brightness of the tone.

- **H**: 352° (The position of the hue on a color wheel: 352 degrees is red.)
- **S**: 100% (The amount of saturation. 100% is completely saturated)
- **B**: 67% (The brightness.)

We see from the HSB representation of the color that rose #1 is highly saturated.

We care about this because Photoshop Elements allows us to adjust the hue and saturation of images. Although we can use this to literally change the color of an object, in my experience increasing the saturation of a picture is the most useful aspect of this tool. There are times when a picture is slightly flat, so that increasing its saturation helps give the image more impact.
Open **Arch.jpg** and save it as **Arch_1.psd**.

This picture was taken in the late evening when the arch was illuminated by red light from the setting sun. Although not a poor image by far, its colors don’t quite capture the actual scene, when the arch literally glowed for a minute or two. We can bring this glow into the picture by slightly increasing the image’s saturation.

Select **Enhance, Adjust Color, Adjust Hue/Saturation** from the main menu.

Watching the image so you can see the effect of the change, move the **Saturation** slider to the right by a small amount (I chose +14). You should see the colors in the image grow more intense and vivid.

*Adjusting the saturation of an image must be done with care. Oversaturated images look artificial and unreal. Unless your purpose is to create an image that is unnaturally vivid, extreme saturation should be avoided.*

I have found that using the **Shadows/Highlights** tool to lighten shadows frequently leaves pictures looking slightly flat. Open **CIA_2.psd**, a picture you may recall improving in the previous lesson using the Shadows/Highlights tool.

Try increasing the saturation of this image slightly. Do you think increasing the saturation improves the image?
Practice Problems

Before you leave class, plan how you would improve the following images and then make the improvements. Use techniques from all the Photoshop Elements lessons you have worked with so far.

1. Capitol_Inn.jpg

2. LivingRoom.jpg

3. Capitol.jpg. After you have improved the brightness and contrast of this image, resize it to a size that is suitable for a Web page – maybe 400 x 500 pixels. Then sharpen the new image. Save as Capitol_1.psd

4. Old_Main.jpg. Sharpen this image.

5. Start with Capitol_1.psd from problem 3. Remove most of the crane that is above the building on the right side of the image. Use the pencil tool to remove parts of the crane that are close to the trees. Then remove the tower on the other side. Remove the reflection of the crane in the pool.

6. Fair.jpg

   - Crop the picture so that it is better compositionally. In the cropped version, the two figures should lie more to the right with the man’s face roughly at one of the rule-of-thirds intersections. The girl’s face will be closer to the center, but not exactly centered. Use the ruler to help judge positions.
   - Reduce the contrast slightly using the mid-tone Levels slider.
   - Magnify the view to 200% and remove the glare on the man’s forehead with the Clone Stamp tool. Clone nearby portions of “unglared” portions of the forehead over the bright highlight. If a clone doesn’t look right, undo it and try again. This takes a little practice.
   - Use the Blur tool to soften the portion of the forehead where you have used the clone stamp.
   - Sharpen the picture with the Unsharp Mask tool. This is the tool you almost always should use to sharpen a picture.

7. Monument.jpg

   - Crop the picture so that the left butte is roughly on one of the rule-of-thirds intersections, with the right butte near the right side of the photo.
   - Remove the two small trucks
   - Adjust the lighting with Levels. This is the tool you almost always should use to adjust the brightness and contrast of a picture.
   - Sharpen the picture
8. Apse.jpg
- Correct the color
- Lighten the walls without changing the exposure of the windows
- Sharpen the image

Review Problems

1. You are working on the picture at the right

a) Which menu item or icon would you click on to start the process of changing the image so it is upright?

What would you do after you clicked on this menu item or icon?

b) The picture is dark. What menu item or icon would you click on to start the process of making it lighter. What would you do after you clicked on this menu item or icon?

2. What you can do with this tool? Describe how you use it.

3. A digital photo you are working with is not really blurry, but on the other hand is not as crisp as you would like. What can you do to make the photo better? Describe how you would improve the photo.