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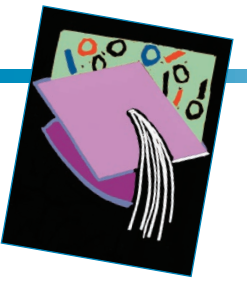

DRAWING CHEMICAL EQUIPMENT WITH ADOBE ILLUSTRATOR, PART 3

GRADIENTS, RETOUCHING, AND MORE OBJECTS

By Daniel Tofan

Adobe Illustrator CS3 provides sufficient tools that let chemistry textbook and laboratory manual authors create complex drawings and publish their own original material. In this final tutorial, the author describes how to fine tune an illustration.

In the first two installments of this three-part tutorial, I showed how to use Adobe Illustrator CS3 to create and assemble shapes, lines, and curves to create complex objects such as chemical equipment. In this last installment, I use gradients to create color effects, add color and perspective to simple objects, and show a few examples of complex objects that you can draw using the tools that I've described in this series.

Gradient Tool

One tool that I used quite often in this project is the *gradient* tool. It works well for adding dimension to objects. Specifically, I used it to give a radial gradient to the ovals that I placed at the ends of a tube to make it look hollow (see Figure 1). The first step is to double-click on the gradient button (see Figure 2), and a box will pop up. At first, your gradient will be in shades of gray. To add color, point to the color you want, and then click and drag it down to one of the tab boxes (you start out with two tab boxes). If you want more variation in color, just grab another color and pull down. You'll see a plus sign below and to the right of your pointer—let go, and your tab will appear. To delete the tab, just click and drag it off the box.

You can slide the tab boxes back and forth, and you can adjust the sliders above the gradient to overlap colors. The color gradients at the top will change the color of the tab box you choose. It works best if you start with the lightest color you want and darken it as you go across the gradient. My student Mary Terry used the gradient tool to create the pH chart in Figure 3, which shows how various indicators change color as a function of pH. Each colored bar is a multitab gradient.

Other Tools

The *eyedropper* tool lets you choose attributes (color, texture, or line width) from objects that you've already drawn and incorporate them into a new object. From the toolbar, choose the eyedropper tool, click on the object that has the attributes you want, and then hold down `Alt`, move your mouse to the object you want changed, and release `Alt`. All the attributes of the first object will be given to the new object, yet the original shape will not change.

The *blend* tool is helpful when you want to blend two or more objects together. Click on one object, then the other, and blend the objects without rotating them. If you want to rotate the image, drag one object's anchor point to another object's anchor point. You can also blend open-ended objects, such as filled curves.

Terry used the *live paint* tool to finish the glass tube in Figure 1. To paint grouped objects, you need to make sure your ovals touch the lines correctly. To zoom in, hold down `CTRL` and click on +. This will give you a much better idea of what grouped objects look like—in the case of Figure 1, the shapes weren't well aligned, which was visible at 600 percent zooming. To zoom out, hold down `CTRL` and click –. Align the objects, and, using the selection tool, click and drag around all the objects, right-click, scroll down, and click Group. You've now grouped all the objects. To paint inside the tube, you must make the group a *live paint group*—go to object, live paint, make, or click `Alt+Ctrl+X`. You can now click on the live paint bucket tool in your toolbox, located in the same tool group as the gradient tool, to choose the color you want to use. Moving the paint can over your drawing will highlight the areas that'll be filled in—for example, the green area of the tube in Figure 1.

The next button is the *live paint selection* tool which is handy when you want to change something that you've already painted. For example, if you want to change the back edge of the oval at one end of the tube in Figure 1, select this button and click on the area you want to change—the area will be highlighted, and then you can make your changes.

The rest of the tools can be used to

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crop, cut, or slice by using either the *scissors* tool for straight lines or the *knife* tool for curved lines. You can use these tools to cut out sections of an object as needed.

My group and I used Adobe Illustrator CS3 successfully to draw many objects that represent equipment commonly found in chemistry teaching laboratories. I hope that those who read this tutorial will find it useful when writing their own material, such as lab manuals or textbooks. Learning how to use a drawing program should free potential authors from having to use copyrighted material, as they can create their own. Students and faculty should also find this tutorial useful when involved in curriculum development, chemical education research, and science or engineering projects. For more sample drawings, visit http://opac.ieeecomputersociety.org/opac?year=2009&volume=11&issue=2&acronym=cise.

Acknowledgments

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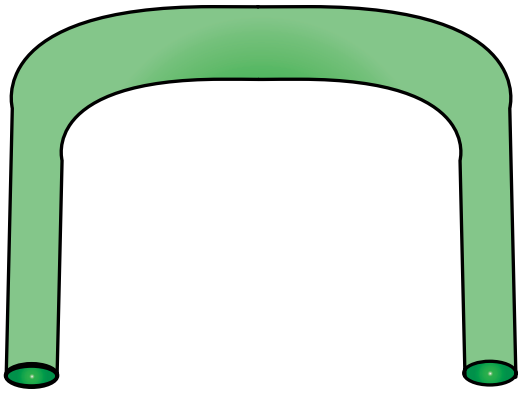

Figure 1. Hollow tube. Mary Terry used a radial gradient to fill the ovals at the endings of the tube, to give perspective.

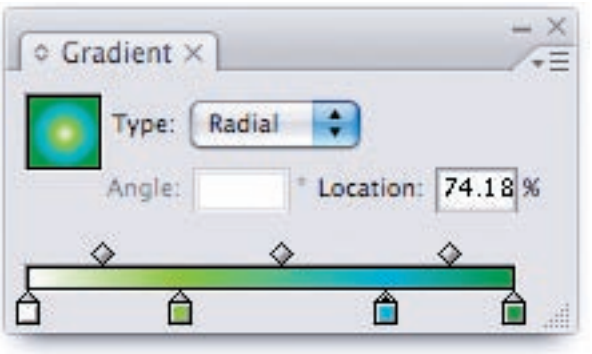

Figure 2. Gradient tool. Users can select several types of gradients and the colors that make them up.

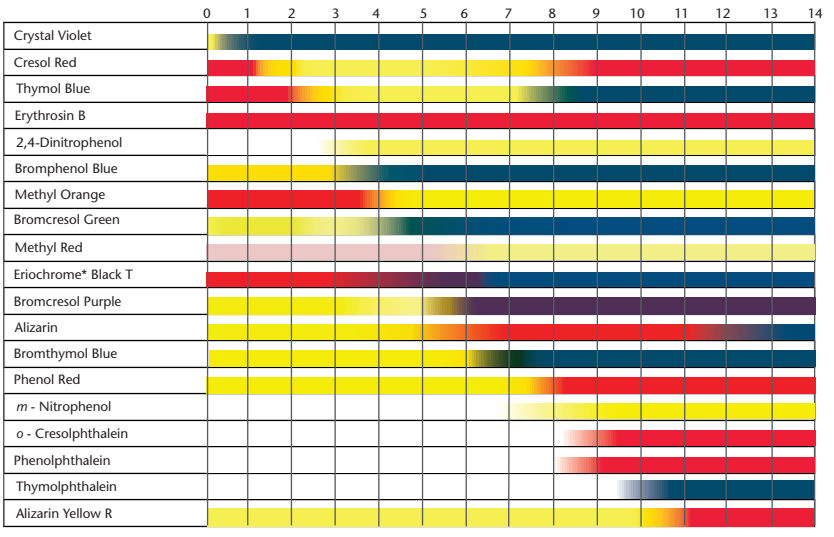

Figure 3. Acid-base indicators (pH chart). Mary Terry created this chart using various linear gradients to simulate the colors of various indicators in solutions of pH values ranging from 0 to 14.