Overview

The painted, nine step value scale is an object, a learning experience and a tool. The object will be the physical outcome of this project. As a learning experience, the project's objective is to increase your sensitivity to value contrasts. The project guides you through a process that gives you methods of evaluating value contrast and will, over the course of the project, increase your visual sensitivity to value contrasts and your ability to discern and compare differences. These learning outcomes will enable you to use the object as a tool for making comparisons between appearances in the natural world and in designed objects, experiences, images and surfaces.

Without the project's learning outcomes, the object is useless and cannot function as a tool for future use. Following the process outlined in this handout is the key to achieving the learning objectives.

Materials

8 ounce jars of Liquitex Concentrated Medium Viscosity Artist Acrylic Colors:
     Ivory Black and Titanium White
Golden brand Fluid Acrylic Matte Medium
Brush; any brand of white nylon bright, #12, one inch wide
3-5 small plastic palette knives for stirring/mixing paint
Roll of 3-M brand, 3/4" drafting tape; no substitutes permitted
7, two ounce plastic jars with hinged lids for mixing and storing paint
Tin can or large plastic container for water to rinse your brush
Illustration board—cold pressed, single weight

Presentation

In the finished scale, each area of color is 2 inches high by 1½ inches wide. The scale is centered on a 17½ x 6 inch piece of illustration board. This allows for a 2 inch border.

Note:
The value scale at the top of the page is intended as an illustration and should not be used as a reference when mixing colors for your value scale. At no point in the process will you be matching colors. Each color will be mixed and evaluated in relation to other colors, but will never be matched to an existing color.

Process

Paint a scale of colors from black—through seven mixed grays—to white. The contrast or visual difference between any two adjacent colors should be the same throughout the value scale. A good way to think about contrast is in terms of edge quality. If there is a lot of contrast between two adjacent colors—if the colors are very different from each other—then the edge between them will be very sharp and clear. If the contrast is very low—if the colors are very similar to each other—then the edge will look very soft and the colors will appear to blend together, especially when viewed from a distance or under low levels of illumination.

High Contrast
Visually Hard Edge

Low Contrast
Visually Soft Edge

To judge the contrast between two colors, they must be touching each other. If there is *any* white space between them, you will not be able to accurately judge the contrast. The two colors should be roughly equal in size and

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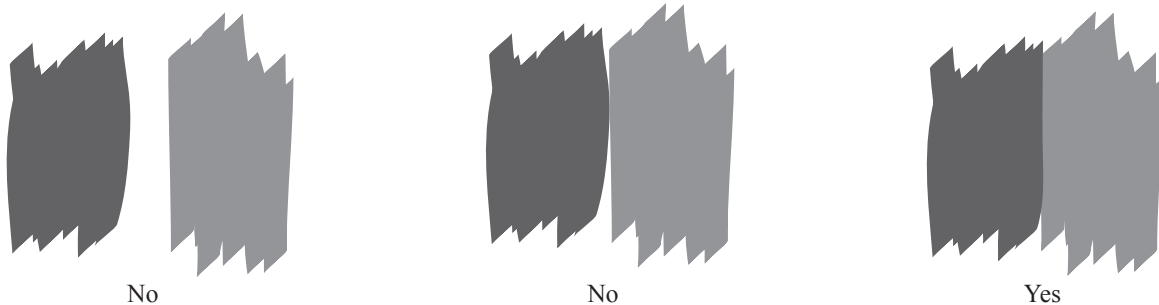
must be painted on one surface with a sharply painted edge between them. It is more difficult to compare colors if they are painted on separate pieces of paper, even if they are cut out and placed side by side or one on top of the other.

Imagine that you are building a staircase. Every step should be the same height. If one step is three inches high, the next seven inches and the one after that five inches, walking up or down the stairs will be very difficult. Try to make all of the steps the same height. In the value scale, the contrast between two colors that are next to each other is analogous to the height of a step on the staircase. Try to create equal contrast or edge quality between the colors.
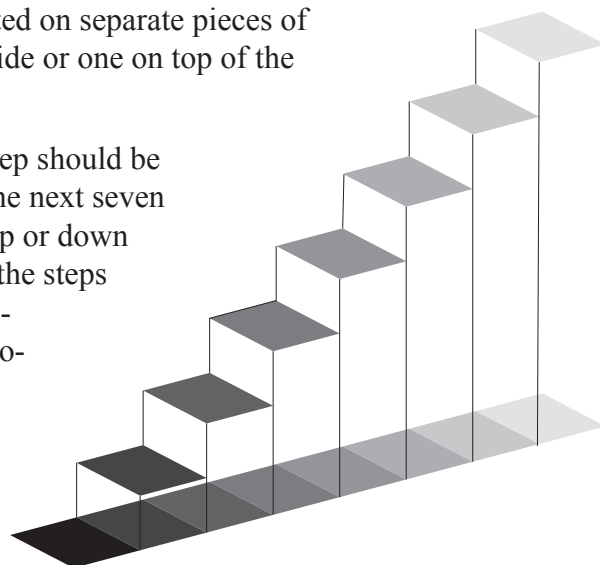
Step One

The process of making the value scale is based on dividing intervals in half. The largest interval in the value scale is between black and white. Begin with those two colors, which are the Ivory Black and the Titanium White paints. Midway between black and white is gray #5. Mix your gray #5 so that it has equal contrast with the black and the white.

This color cannot be mixed using equal amounts of black and white because of what is know as tinting strength. If two pigments have dissimilar tinting strengths, one will have a larger impact on the resulting mixture. Be very careful mixing this color. The quality of your value scale will rely very heavily on the accuracy of your gray #5. You will need to mix at least a half a container of gray #5 to complete the project.
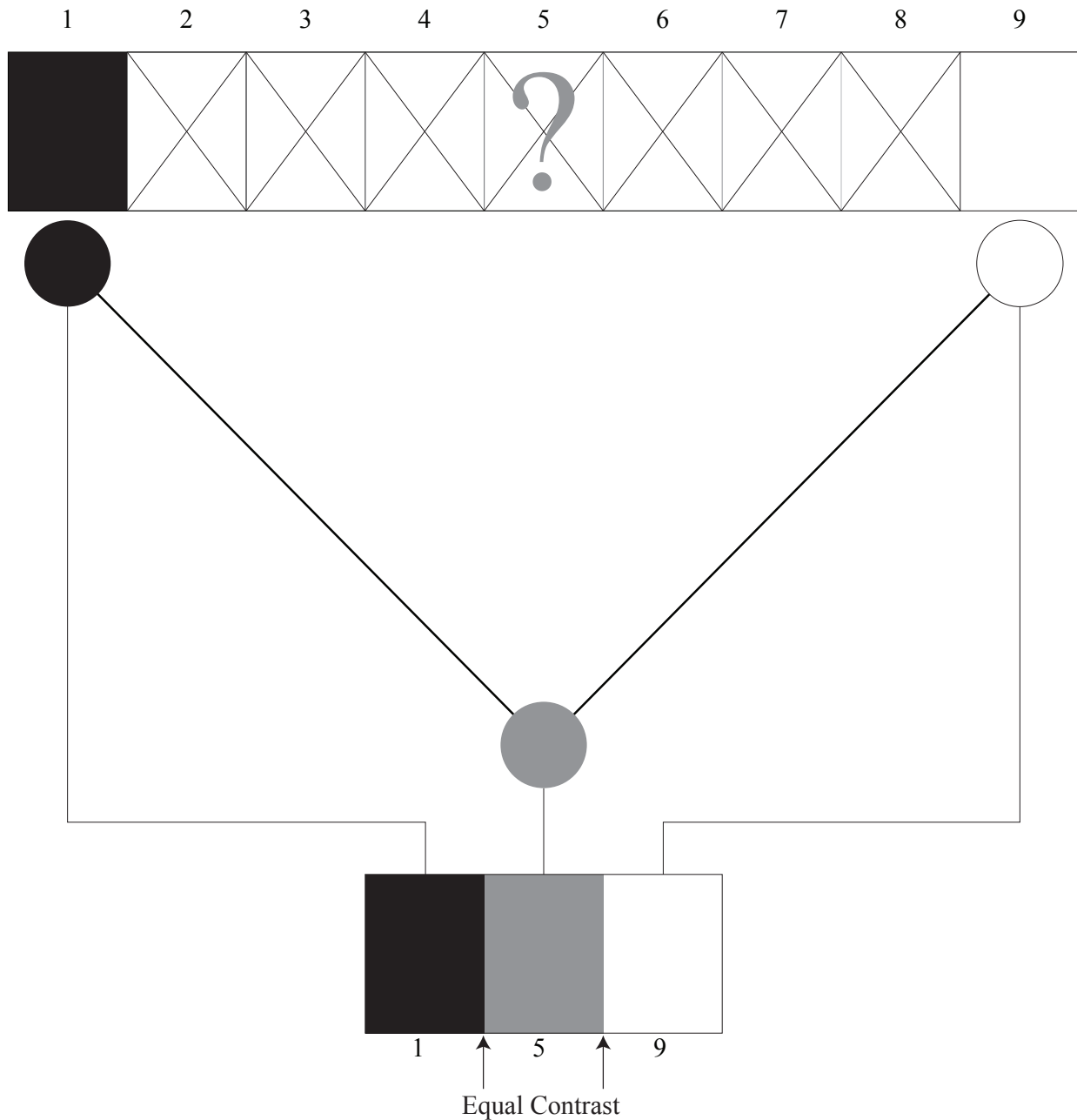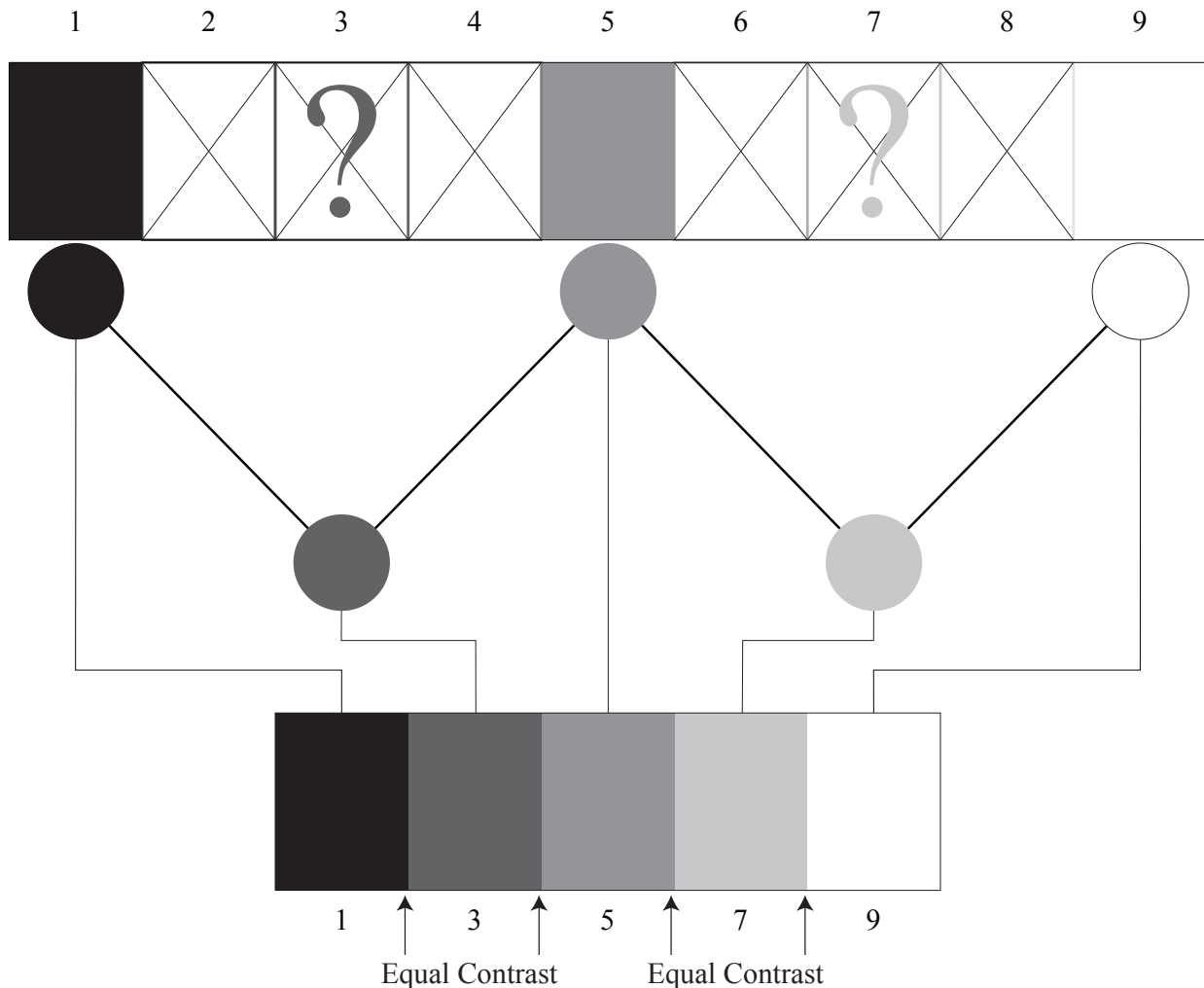
Evaluate your #5 gray by painting a three step value scale. In your three step scale, there should be equal con-

trast at the two edges between the three colors. A good way to judge if the contrast is equal is to squint while looking at the edges. Squinting will accentuate any differences in the contrast at the two edges. This is a difficult judgement to make at this stage of the project because both edges exhibit fairly high contrast. After completing step two, you may need to re-evaluate your gray #5.

The correctness of the color is not a matter of its individual appearance, but of its relationship to black and white. So, you need to be paying attention not to its center, but to its edges.
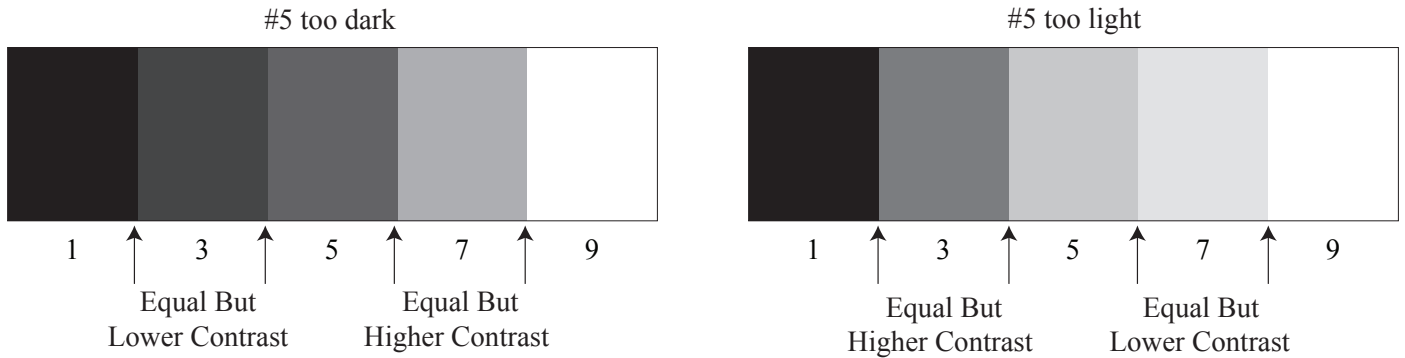
Step Two
Once you have established this *middle gray* by dividing the interval between black and white in half, you can divide the two new intervals in half. Determine the mid point between your gray #5 and black. Then, determine the mid point between your gray #5 and white. These would be gray #3 and gray #7, respectively.


Evaluate your #3 and #7 grays by painting a five step value scale. This time, you will be looking for equal contrast between edge 1:3 and edge 3:5 as well as between edge 5:7 and edge 7:9. If it is impossible to adjust the mixtures of #3 and #7 to achieve equal contrast at all four edges, what does that tell you about your gray #5?

If the contrast at 1:3 and 3:5 is lower than the contrast at 5:7 and 7:9, then your gray #5 must be too dark. If the opposite is true, then your gray #5 must be too light. If necessary, repeat steps 1 and 2.

#5 too dark

1	3	5	7	9

Equal But
Lower Contrast

Equal But
Higher Contrast

#5 too light

1	3	5	7	9

Equal But
Higher Contrast

Equal But
Lower Contrast

Step 3

At this point, you have mixed every other color in the scale. Now all you have to do is to divide each of the remaining intervals in half by mixing gray #'s 2, 4, 6 and 8.

1	2	3	4	5	6	7	8	9

1	2	3	4	5	6	7	8	9

Equal Contrast   Equal Contrast   Equal Contrast   Equal Contrast
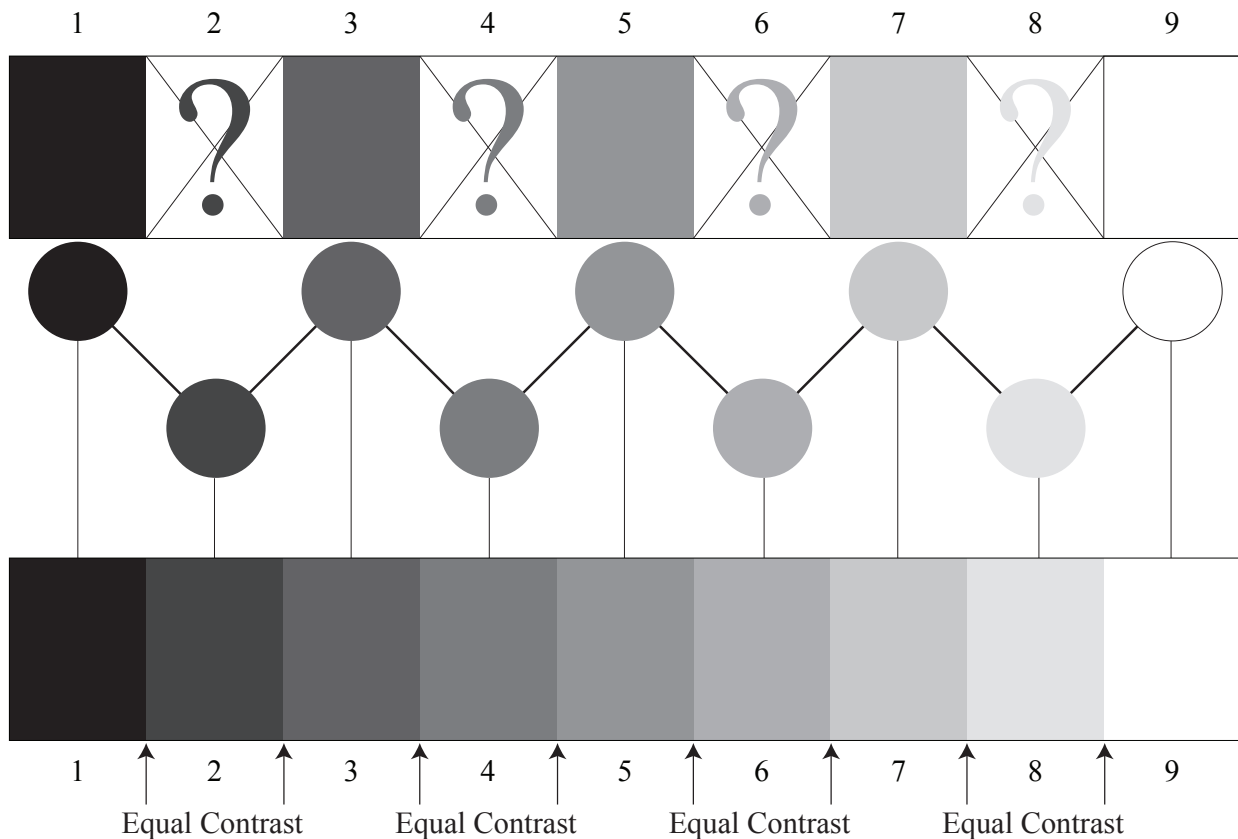
Evaluate your gray #'s 2, 4, 6 and 8 by painting a nine step value scale. You are seeking to establish equal contrast at *all* edges. In the same way that you re-evaluated your gray #5 at the end of step 2, at this point, you will need to re-evaluate #3 and #7. If necessary, repeat steps 2 and 3.

Step 4
Make a new, clean version of the scale on a fresh piece of illustration board. In the finished scale, each area of color should be 2 inches high by 1½ inches wide. The scale should be centered on a 17½ x 6 inch piece of illustration board. This will allow for a 2 inch border.

Follow the technical guidelines on the next few pages.

Step 5
Complete the project by protecting it with a cover sheet.

Technique (General Issues)
The colors in the diagrams in this handout are intended as illustrations and should not be used as references when mixing colors for your value scale. At no point in the process will you be matching colors. Each color will be mixed and evaluated in relation to other colors, but will never be matched to an existing color.

Every time you mix a gray, consider the contrast or edge quality between it and the colors that you are placing it between. For example, when you mix gray #3, paint it on a scrap of paper between areas of black and gray #5.

Colors must be touching to be compared. Areas of color must be equal in size. Colors should be painted on one surface with a sharply painted edge between them.

Mix all grays in two ounce plastic jars with hinged lids. Label each jar by writing a number on a piece of drafting tape and sticking it on the jar. If your jars do not have hinged lids, you should label both the jar and the lid.

All colors must be mixed from black and white and not from other grays. This will develop your ability to mix colors and will avoid your running out of colors that you have mixed.

Use sufficient layers of paint to obtain full opacity. You shouldn't see any brush strokes or the lightness of the illustration board showing through the paint.

Board Preparation

1. Cut illustration board to the required size.

2. Measure carefully and draw light lines with a hard pencil to define your boxes. Be careful not to apply too much pressure. You don't want to emboss the board. Try not to draw lines in the margins/border.

3. Erase all extraneous lines and clean the margins/border of all marks. The Fluid Matte Medium will seal in any marks making it impossible to remove them later.

4. Apply two coats of Fluid Matte Medium to the front and the back of the board. Brush vertically and keep coats thin to avoid texture. Work on a clean surface such as a sheet of drawing paper. Sealing the front and the back of the board will prevent it from warping. The Fluid Matte Medium also soaks into and strengthens the paper fibers of the surface and gives the paint a very good surface to adhere to.

5. Let the board dry for eight hours before continuing work. The board is a three-layer laminate that is held to-gether with a water soluble glue. The water in the Fluid Matte Medium passes through the top layer of paper and softens the glue. If you begin working on the board too soon, the surface may blister or tear.

Taping Technique

Tape can be used to achieve sharp, straight edges. It is a multi-step process that must be followed closely. 3-M brand drafting tape is the only tape to use for this process.

1. Apply tape along the entire top and bottom edges of the scale. By running continuous pieces of tape along these edges, you will insure that the tops and bottoms of all of the boxes will be perfectly aligned. Position the tape so that the paint will cover the pencil line. You don't want to see a pencil line running around the perimeter of your scale.

    Always fold over one end of a piece of tape so that you have a tab that you can easily grab when removing the tape. You don't want to be picking at the end of a piece of tape with your finger nail. You might scratch your work.

2. Mask the top and bottom borders with paper and tape to keep them clean.

3. Apply tape to the vertical edges of every other box. Start with boxes 1, 3, 5, 7, and 9.

4. Mask the left and right borders with paper and tape.

5. Drafting tape has a crepe paper backing, which makes it conformable to uneven or rough surfaces. It also makes it possible to bend the tape into a curve. However, the undulating nature of the backing can allow paint to seep under the tape. To prevent this, the tape must be flattened against the surface of the board. This is referred to as burnishing or scoring the tape.

    First rub the tape with the tip of your finger so that it is firmly adhered to the board. Then, at the edge of the tape, where paint will be applied, burnish the tape with your fingernail so that it is flattened. Finally, at each corner, you need to use the edge of your fingernail to press to top layer of tape firmly against the edge of the bottom layer of tape. This will prevent paint from seeping into the tiny channel that results from the top layer of tape literally lifting off of the surface of the board in order to move on top of the other piece of tape. See the *before* and *after* illustrations, below.
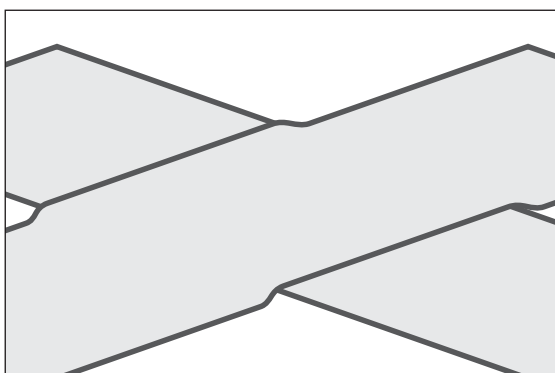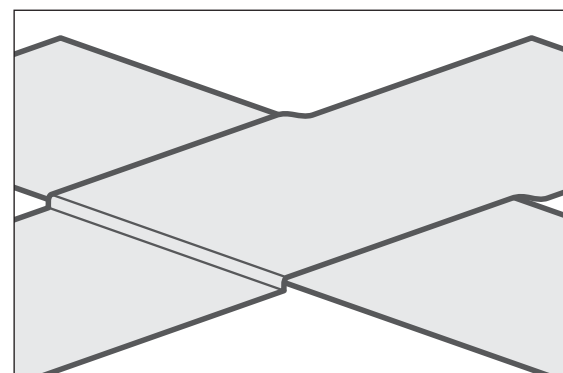
Before   After

6. To insure a crisp, bleed-proof edge, apply one coat of Fluid Matte Medium to the edge of the tape. Only apply the Fluid Matte Medium to the edges where paint will be applied—the inside of each box. The Fluid Matte Medium will fill any remaining spaces under the tape, preventing paint from bleeding underneath. It will also cause the paint to break along a very crisp edge as you remove the tape at the end of the process.

7. Apply at least 3 thin coats of paint to each area to insure full opacity. Each coat of paint must be dry before applying the next one. Otherwise, the previous layer will partially dissolve and result in a very uneven surface. You don't want to see any brush strokes or the lightness of the illustration board showing through the paint. Brush the paint vertically, stopping and starting on top of the tape outside of the box. Whenever the brush contacts the surface or is lifted from the surface, a mark is produced. To avoid such marks, begin and end each stroke outside of the box.

   Use the tips of the bristles to keep the paint layers thin and even. To not expect to get a lot of coverage with the first coat. Applying thin, even coats of paint in key to achieving a smooth surface. Texture influences the appearance of value. So, you want texture to be consistent and at a minimum. Always brush the paint vertically. Vertical brush strokes are less visible than horizontal ones.

8. When the last coat of paint is fully dry, carefully remove the vertical pieces of tape. Grab the folded end of the tape and slowly pull it back at a low angle. If you pull perpendicular to the board or with too much force, you can tear the paint and/or the paper surface of the board.

9. Repeat steps 3 through 8 for boxes 2, 4, 6 and 8. Be careful when positioning the new, vertical pieces of tape. You want to see the adjacent color just peeking out from under the tape. If too much of the adjacent color is peeking out, you will get a visible overlap of the two colors. If it does not peek out at all, you may get a white stripe of illustration board between the colors. The goal is a perfect meeting of the two colors.

10. Remove all tape and masking materials.

11. Let the paint dry overnight before adding a cover sheet (see next page).

Cover Sheet

A cover sheet protects the surface of your work but can be lifted easily so that the work can be viewed. It should be made of white tracing paper. The edges of the cover sheet should be flush with the left, right and bottom edges of the board. The top edge of the cover sheet should wrap over the top edge of the board and extend one inch onto the back of the board where it should be taped along its entire length. Do not tape the cover sheet to the board at any of the other edges.
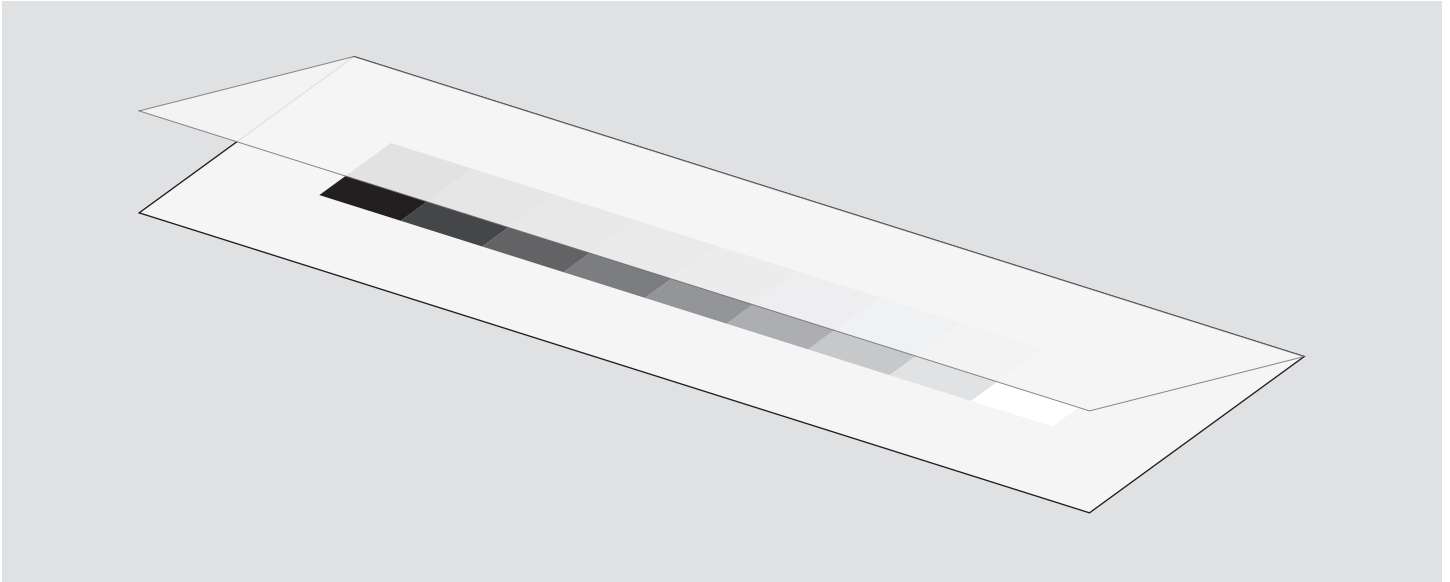
Congratulations! Your value scale is complete. Don't forget to write your name, section letter and instructor's name on the back of the board.

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