



Photos by Matt Graves unless otherwise noted

Create a color resource notebook to explore color mixing and record your experiments.

# Find Your Colors!

## Road Map to Repeatable Dyes

BY TERRY MATTISON

*I compare fiber and yarn dyeing to cooking,* and the dyes I use are like the spices in my kitchen. Some are subtle and required in larger amounts in a recipe, while others are quite spicy, packing a bold, zesty punch. Depending on what you are cooking and your personal tastes, you will choose the amount of each type of spice that is pleasing to your own personal palate. We learn to identify the spices we like, the ones we don't, and how much of each to use. Learning how to use dyes is much the same. Learn which colors make your heart sing, and chances are, you will start to understand them better when they appear in your closet, your backyard, and your fiber stash.

Wouldn't it be fabulous to formulate your own personal dye recipes to create colors that speak to you and that you can create whenever you wish? You can! It just takes a bit of practice. First you need to get to know your dyes, which is like filling your spice rack.

### HOW TO GET STARTED

If you want to learn more about dyeing, I strongly encourage you to create a color-resource notebook. Creating a notebook is a project in itself, but it's not difficult. You can choose to make your notebook as simple or as complex as you like. I'll outline a series of exercises here that allows you to create watercolor-



style notebook pages and a sample skein using the same small amount of dye. Together, these samples create an invaluable resource.

Gather the following items:

- 1% stock solutions of the six Lanaset primaries\*
- 1% stock solutions of the two Lanaset modifiers\*
- Watercolor or mixed-media paper
- 2 sizes of syringes (10 ml and 3 ml)
- Small, short-bristled brush, such as a stencil brush
- A mini-muffin tin (a 12-muffin size works well)
- 7 glass pint jars half full of water
- 10 g sample skeins, wetted
- Vinegar or solution of citric acid†



Mini-muffin tins are a great way to mix small amounts of dye. Terry uses one given to her by a friend that already had dye percentages marked using a Sharpie pen.

Photo by Terry Mattison



## Pick Your Primaries

I created the color recipes from a set of eight Lanaset acid dyes: six primary colors and two Lanaset modifier colors (Brown B and Black 2B) used to adjust color value. The colors are shown here at 1.0 depth of shade (DOS), which is a measure of how much dye is added to the fiber. A basic scale of DOS would be: 0.1 pale pastel, 1.0 medium, and 3.0 deep. The equation is simple: weight of fiber in grams (WOF) times DOS = ml of dye (1% solution). For my 10 g fiber samples at 1.0 DOS, I used 10 ml of dye solution.

The primaries have undertones—tiny hints of their color-wheel neighbors. Knowing this and training your eyes to discern these minute differences will allow you to dial in your color recipes.

Polar Red has a blue undertone, making it slightly cool. Scarlet has a yellow undertone and is warmer. Sun Yellow has a blue undertone and is cool. Gold has a red undertone and is warmer. Blue 2R has a red undertone and is cooler than Turquoise, which has a yellow undertone and is warmer.

**Note:** Polar Red 390 is frequently used to supplement Lanaset and Sabrasat dyes and can be purchased from Pro Chemical and Dye (see Resources).





Secondary colors, for the most part, are cheery and bright. Percentage gradations: (from top) Yellow to Turquoise, Gold to Polar Red, Gold to Polar Red, Scarlet to Blue, and Polar Red to Blue.

## Secondary Colors

A secondary color is created from two primary colors, so from our six primaries, we can create 12 secondaries. Creating percentage gradations is a fun and instructive exercise that allows you to see how these primaries interact!

We'll start by exploring an 11-step gradation using the following dye ratios: 100/0, 90/10, 80/20, 70/30, 60/40, 50/50, 40/60, 30/70, 20/80, 10/90, and 0/100. A 12-cup mini-muffin tin is perfect for mixing dye samples, and I write the ratio on each cup for reference.

SG 90/10 is a blend of 90% Scarlet and 10% Gold. I make these blends in 10 ml sample sizes, so the percentages are easily calculated in my head. SG 90/10 would consist of 9 ml Scarlet to 1 ml of Gold. Note that the first and the last are not blends but are 100% of each primary. Most of the time, I choose to skip the 70/30 and 30/70 mixtures because they are so similar to the colors on either side of them.

I don't fill the 100/0 or the 0/100 cups with dye because I already have those in my stock solution containers. So now we are looking at a seven-step gradation. Fill the seven cups as labeled, measuring out both primary colors needed and adding them to the cups in the tin.

## Apply to Paper

Now you are ready to paint circles or swirls of each of these blends on your watercolor paper. I make a grid on my sheet, labeling the gradients across the top and the secondary blends down the page.

## Apply to Fiber

The nearly 10 ml of each color mix can now be used to dye small sample skeins of yarn. Color is easier to see if more of the color is present; when using handspun, spin thick singles, or create at least a three-ply yarn if spinning very fine singles. The most important thing is that you choose white fiber; gray or yellowish fleece will greatly affect your final color. A fancy or special fleece is not necessary. In fact, for these samples, I used a stash fleece. It was a nice clean white but suffered from second cuts and vegetable matter—perfect for dye samples!



## Secondary-Color Mixes

Scarlet/Gold (SG)	Blue/Gold (BG)	Scarlet/Blue (SB)
Scarlet/Yellow (SY)	Blue/Yellow (BY)	Scarlet/Turquoise (ST)
Polar Red/Gold (PG)	Turquoise/Gold (TG)	Polar Red/Blue (PB)
Polar Red/Yellow (PY)	Turquoise/Yellow (TY)	Polar Red/Turquoise (PT)

Use the larger syringe to extract the dye solution from each cup separately, squirting the dye into a series of glass pint jars for dyeing. Fill the jars about half full of water, add vinegar or citric acid solution, and drop in the sample skein. I then use a steamer to heat the jars and set the dye.

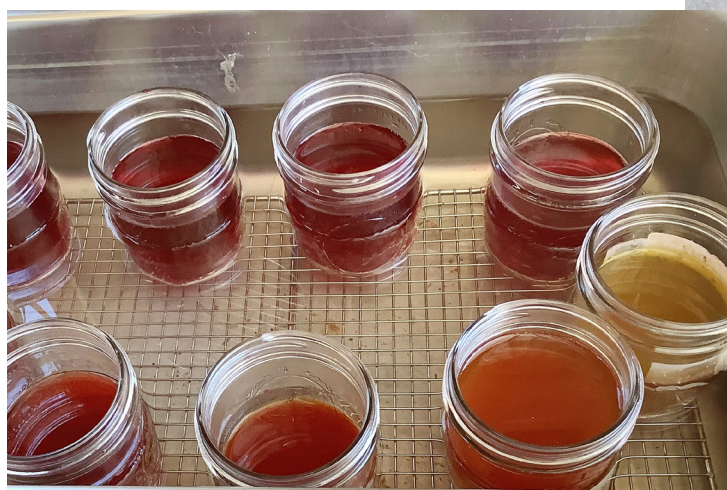
Dyeing all of the secondary colors and their gradations will take time. It's not a fast process, and I recommend doing one combination at a time. When you've completed all the secondary combinations along a gradient of seven steps, you will end up with 84 secondary-color and six primary-color samples along with a painted paper chart.

Take some time to carefully observe your results. Can you identify the "spicy" primaries? Which primaries are more subtle? If you decide to dye fiber rather than yarn, your eyes and brain will have time to observe each secondary-color gradation as you spin it.

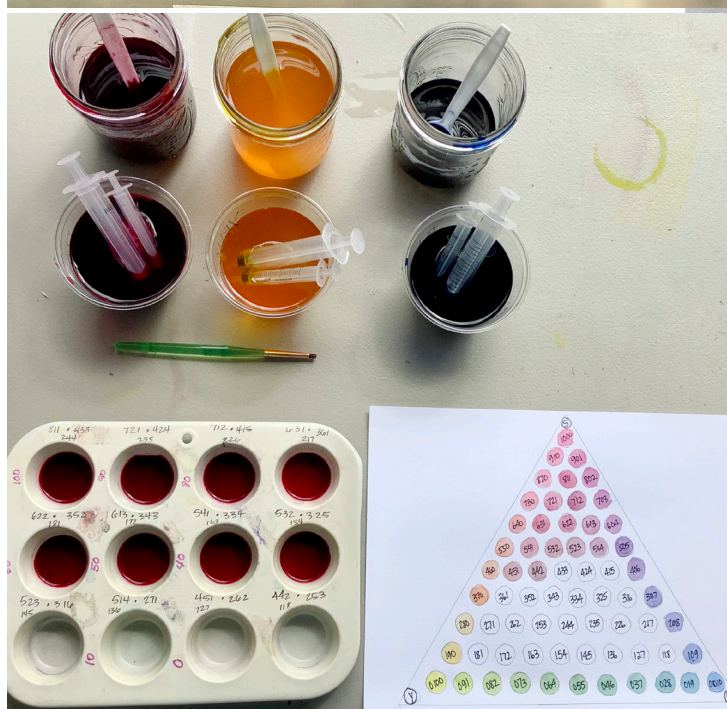
I find it helpful to make as many notes and observations as I can. For instance, I observe that Polar Red dominates, and Scarlet is a far weaker primary red. Turquoise is the brighter of the two blues and has a yellow undertone, whereas Blue 2R has a red undertone. Spending time with your samples and making notes about your observations will help you learn to identify and use color.

## Tertiary Colors

Tertiary colors are created by blending three primary colors in various amounts. These colors tend to be less bright and more nuanced and understated. They play well as the main color in a textile that uses brighter secondaries for short blasts of color. When painting samples for my notebook, I use a triangle grid to organize color mixes instead of the simple graph I use for secondaries. In each corner of the triangle, I identify the three colors I plan to mix. This allows me to see the gradations of three primaries at the same time.



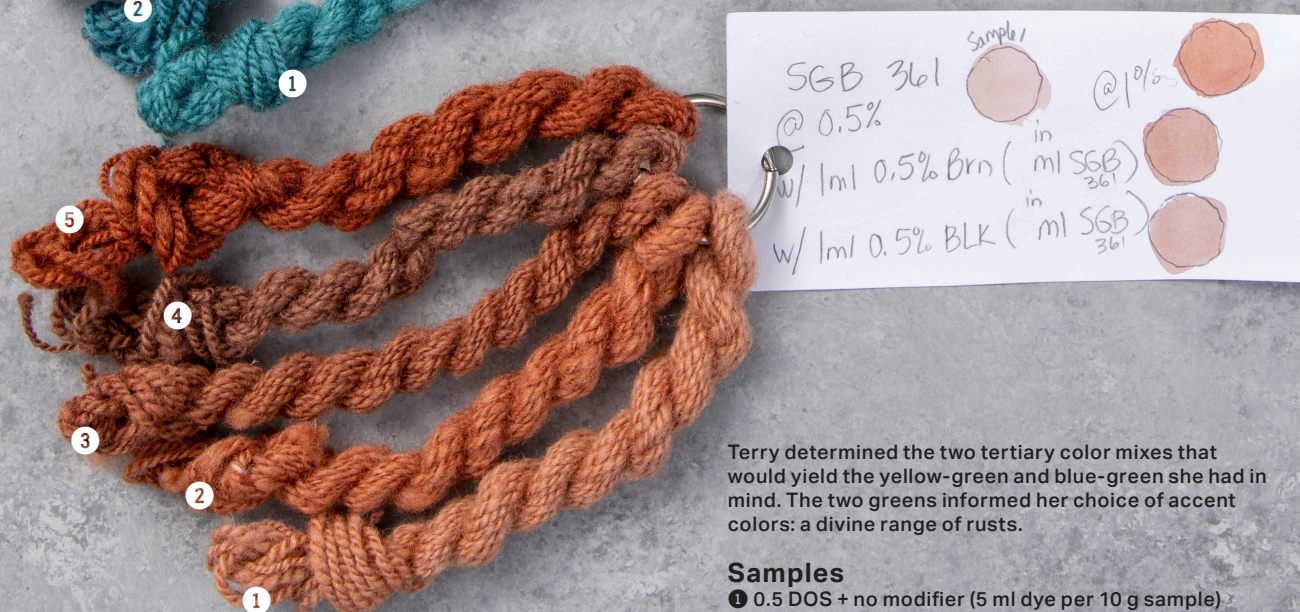
A steamer is a great way to heat glass jars containing sample skeins.



Three-color mixes can be organized in muffin tins and recorded in your notebook.

Photos by Terry Mattison





Terry determined the two tertiary color mixes that would yield the yellow-green and blue-green she had in mind. The two greens informed her choice of accent colors: a divine range of rusts.

### Samples

- ① 0.5 DOS + no modifier (5 ml dye per 10 g sample)
- ② 1.0 DOS + no modifier (10 ml dye per 10 g sample)
- ③ 1.0 DOS + 10% brown modifier (10 ml base recipe dye + 1 ml brown for 10 g sample)
- ④ 1.0 DOS + 10% black modifier (10 ml base recipe dye + 1 ml black for 10 g sample)
- ⑤ 3.0 DOS + no modifier (30 ml dye per 10 g sample)



Note there are three secondary gradations located along the outer edge of each triangle.

Each sample or recipe is identified by three letters—acronyms of the three primary colors used—and a three-digit ratio or percentage number. Using a 10 ml sample, all three portions of primaries will add up to 10. For example, SGT 361 is a tertiary color created by blending 3 ml of Scarlet, 6 ml of Gold, and 1 ml of Turquoise. The eight main triangles are: SYB, SYT, PYB, PYT, SGB, SGT, PGB, and PGT.

Dyeing a fiber sample of each of these 288 tertiaries will create a nice set of samples for your dye book, but it can feel overwhelming. You might begin by painting triangles without dyeing a sample of each, or you could pick two or three of the mixes from each triangle for the dye samples.

## TESTING TERTIARIES: FIND YOUR COLOR!

I wanted to create a handful of green colors, inspired by my front-porch view in the Pacific Northwest. I reviewed my tertiary color triangles in my notebook and created a list of possibilities. Next, I mixed the 10 ml sample of each color recipe and painted each on paper, labeling each one.

To create my palette of greens, I knew I wanted two different tertiary color recipes: a green with yellow undertones and one with blue undertones. I chose SGT 154 for my yellow-green and SGT 127 for my blue-green.

After choosing the final one or two colors, create the 10 ml of dye needed for the recipe, dye the fiber samples as before, and spin them. These are 1.0 DOS samples, and now you can try other levels of saturation: for example, 0.5 and 3.0. This means that you will use half or three times the amount of dye for the same amount of fiber. You can see that DOS can make a huge impact on the final color of your fiber!

Next, try adding modifiers to your 1.0 DOS base recipe color. Modifying with Brown will dull the color and give a slight yellow undertone. Black will also dull a color, adding a red undertone. You may find the Brown or Black was the right move, getting you closer to your target color, but perhaps this was too much or too little adjustment. From there, you can try changing

the amount of modifier.

Because modifiers can overpower a color mix quickly, I use them at half strength by diluting a small amount of my 1% stock solutions with equal parts water. This reduces their strength by half, creating a 0.5% solution.

For my final samples #3 and #4 above of SGT154, I've added 1 ml Scarlet, 5 ml Gold, 4 ml Turquoise, and 1 ml Brown, or Black as noted. If you are a numbers person, you will note that adding the modifier actually changes the overall ratio of the individual dye solutions. I choose to record them with the original recipe notation (SGT154) and add the modifier to my notes. When I'm ready to use this color in a project, I can simply scale up the recipe for whatever amount of fiber or yarn I wish to dye.

Working through sample colors in this way should get you close enough to the colors you are searching for, as I did here. At first this process might seem overwhelming, but it's like learning to cook with spices: few of us create a masterpiece our first time in the kitchen. ●

*\*Following the manufacturer's instructions for mixing Lanaset powder into a liquid dye, create a solution of 1 part dye to 100 parts water. While technically this ratio equates to a 1.01% solution, it will make your dye math simple. I guarantee your eyes will not be able to tell the difference!*

*‡Add 4% citric acid based on WOF or enough vinegar to lower the pH to 4.5–5.0. For a 10 g fiber sample, this would be 0.4 g of citric acid crystals. For convenience, I make a 2% citric acid solution (20 g crystals/1000 ml water). The dose of this solution for a 10 g fiber sample is 20 ml.*

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## Resources

Dharma Trading, [dharma trading.com](http://dharma trading.com)

Knutson, Linda. *Synthetic Dyes for Natural Fibers*. Loveland, Colorado: Interweave, 1986.

Menz, Deb. *Color in Spinning*. Loveland, Colorado: Interweave, 1998.

Prochem, [prochemicalanddye.net](http://prochemicalanddye.net)

**Terry Mattison** learned color theory and all about undertones the hard way: through a career in the paper industry. Terry matched color on a fast-running paper machine; it was trial by fire! Now she enjoys matching color and dyeing at a more sedate pace using both synthetic and natural dyes. Find her on Ravelry and Instagram as [magpiedyestudio](https://www.instagram.com/magpiedyestudio).