Greener Shades World of Color

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Introduction

Welcome to Greener Shades™ World of Color. Greener Shades™ are non-chrome, non-heavy metal acid dyes that have been specifically formulated for superior light and wash fastness. They are designed for dyeing all animal or other protein fibers as well as nylon.

Greener Shades™ are an environmentally responsible choice for dyeing. As there are no toxic metals used in their creation, no residual heavy metal molecules are found in the dye powder thus finding their way back into the environment, or being exposed to the dyer. Any fiber, yarn or cloth that is dyed with these dyes will not leave any toxic materials when it biodegrades. Depending on the color used, Greener Shades™ dyes can require less energy as exhaustion may occur at lower water temperatures.

The purpose of this book is to demonstrate the wide range of color possibilities available using Greener Shades™ dyes. Each color shown provides its own formula and allows the user to easily choose a palette or suite of colors in which to work for a specific project or choose on a whim.

Although there are over 100 samples shown in this book, it is just a small range as the possibilities of colors are endless. The reader is encouraged to venture off using her own formulas and experimentations to unveil the undiscovered.

General Information

How This Book is Organized

The color combinations presented in this book are arranged in a way that is intuitive and where an in-depth understanding of color theory is not necessary. It is easy for the reader to follow the graduations and easily make predictions of other in-between combinations of those shown.

Fiber Types, Natural Pigmentation and Pre-Treatments

All of the dyed samples shown in this book are 100% wool that is a good bright white. Please be aware that different fibers will take up dye differently due to many factors including the number of dye points naturally on the fiber, the natural pigmentation of the fiber, and any pre-treatments the fiber has experienced such as chlorinating, shrink resistance, optical brightening, processing agents, etc.

Generally, if fiber has been pre-treated, the dye affinity has been increased. A leveling agent can be helpful in dyeing pre-treated fibers and yarns.

Fibers with a natural pigment will dye but the result will have a different tone than on white fiber. Many times beautiful shades can be obtained by over-dyeing naturally colored fibers. Alpaca and llama fiber is especially beautiful over-dyed with Greener Shades™.

Because of the number of dye points, silk and mohair will dye more intensely than wool, and wool more intensely than alpaca and llama. When working with blended fibers, or if one is unsure as to how their fiber will perform in the dye bath, it is helpful to do a sample dyeing to observe how the fibers will perform.

1% Depth of Shade (DOS)

All samples shown are dyed at a 1% depth of shade unless specifically noted. This means that the amount of dye used weighs 1% of the weight of the yarn (or fiber) dyed. This percentage shows a good medium representation of the various colors. To acquire a deeper shade of a color shown, a stronger percentage may be used (i.e. 2%), and for a lighter shade a smaller percentage can be used (i.e. 0.5%). Note that all fibers have a limit of dye uptake and will not dye any further once this point has been reached. Also, when dyeing very light shades it can be difficult to achieve even dyeing and a leveling agent can be useful in this case to achieve uniform color.

Example 1:

To dye a 100 gram skein of yarn 100% River Blue at a 1% depth of shade, a total of 1 gram of dye will be used.

100 grams X 1% = 1 gram River Blue

Example 2:

To dye a 100 gram skein of yarn 60% River Blue, 20% Flame Red, and 20% Sunrise Yellow at a 1% depth of shade, a total of 1 gram of dye will be used.

100 grams X 1% = 1 gram Total Dye
or
1 gram X 60% = 0.6 grams River Blue
1 gram X 20% = 0.2 grams Flame Red
1 gram X 20% = 0.2 grams Sunrise Yellow

Note on the above examples that the dye can be put into a stock solution, but the amount of dye used will be the same. See the section on *Preparing a Stock Solution* if this is of interest to you.

Primer for Successful Dyeing

Although it is not necessary to be an expert in chemistry to have a successful experience with Greener Shades™ dyes, it is important to have a general understanding of the factors involved for proper chemical bonding to occur in the dye pot.

Greener Shades™ dyes require two things in order to chemically bond with protein fibers, a pH of 4.5 and a temperature between 180 ℉ and 210 ℉. The proper pH level can be achieved by the addition of a common acid like white household vinegar. Some prefer to use citric acid crystals if they do a fair amount of dyeing. Adjusting the pH at the proper time in the dye cycle along with the proper temperature of the dye bath is all that the Greener Shades™ dyes require for permanent chemical bonding. If the pH is too high, the dye take up will not occur and the dye bath will not exhaust, if too low there is a risk of damaging the fiber and having the take up occur too quickly. Likewise if the temperature does not reach the minimum level, the dye bath will not exhaust.

Many factors affect pH. An obvious one being the pH of the water used, this can vary greatly from location to location. The other factor is the dye itself. Each color of the Greener Shades™ suite is a different set of chemicals with its own starting pH. If a large amount of dye is used, more acid will be required to bring the pH to the proper level, however, depending on the color, more or less acid will be required. For example, when using Coral Reef Aqua, one may be required to use about 3 times as much acid than if using River Blue to achieve the same pH with all other factors the same. This is one important reason to measure pH whenever possible. The pH can be measured with pH test papers. If unable to utilize pH test papers, it is recommended to slowly add the acid component until the dye seems to take while giving a good 5 minutes for each addition to be analyzed.

Temperature is also an important factor in achieving good exhaustion in the dye bath as well as long term wash and light fastness. Again, the temperature should not rise too suddenly, nor should it be too low for successful results. A thermometer is extremely helpful to monitor the dye pot. If however, with proper pH, a dye bath has exhausted to a satisfactory results and the temperature is a minimum of 180 °F, the heat source can be turned off and the cool down period can then start without risk to the fastness results.

Preparing a Stock Solution

A stock solution is a solution of a pre-set amount of dye dissolved in a pre-set amount of water. If an accurate scale for weighing small amounts of dye is not available and repeat dyeing is a requirement, using stock solutions can be helpful for measuring the amount of dye needed. Stock solutions are created and described as a certain percentage such as a 1% stock solution. This percentage represents the percentage in weight of the amount of dye and the amount of water it is dissolved in. Then when ready to use, one measures the same weight of the stock solution as the weight of the fiber to be dyed.

To create a 1% stock solution, 0.5 ounces of dye powder is dissolved in 50 ounces of water. Sometimes it is easier to switch to the metric standard to avoid confusion. For example, to dye 455 grams (or 1 pound) of fiber, 4.55 grams (or 0.16 ounces) of dye is diluted in 455 ml of water. Then if a 100 gram skein of yarn is to be dyed, 100 ml of stock solution is used.

To make a stock solution it is best to use a non-reactive jar such as glass or plastic (laboratory grade). Place 4.55 grams of dye powder in a jar and gradually add warm water to the powder. First add enough water to make a paste, then allowing the dye to dissolve with each addition, continue adding warm water until 455 ml has been added. Cover the jar tightly. Stock solution stored in a cool dark place will generally last for six months or so.

Safety and Handling

Although non-toxic and non-hazardous, Greener Shades™ are chemical powders and should be treated as such. They are not intended for inhalation or ingestion. Due to the pH it is advised that a dust mask be worn while handling dyes in the powdered state for a prolonged time. Use rubber gloves when measuring powders and stock solutions, and when working with the dye pot. All utensils should never be re-introduced for food preparation. Work in a well ventilated area.

When measuring powders, it is helpful to work over a damp paper towel or newspaper to grab any loose dye. This also helps to prevent staining work surfaces. If stains do happen to occur, household bleach can be used to remove any accidental drips or smears from work surfaces.

Instructions for Dyeing

Required Materials

- Large non-reactive pot (stainless or enameled) - Goods (fiber or yarn) should have plenty of room and not be crowded in the pot for even distribution
- Acid – white vinegar, citric acid or acetic acid
- Safety items – rubber gloves, mask (if desired)

Recommended Materials

- Thermometer
- pH measuring equipment - paper or meter
- Scale - to measure dye powder or stock solution

Fiber Preparation

Fiber or yarn should be clean and free from processing oils, conditioners, or finishes.

1. Wet goods in plain warm water. This can be done immediately after washing if needed. Let the goods soak to become thoroughly wet. Note that alpaca, llama, dog and angora fibers need a good long soaking.

Dye Bath Preparation

1. Circulate goods at 100°F for 15 min in pot containing about 2 gallons of water per lb of goods. Hot water from the tap should be sufficient starting temperature.

2. Measure out the appropriate amount of dye powder(s) or stock solution. Dye powder should be dissolved in small container with hot tap water. Stir carefully until fully dissolved. If an accurate scale is not available see Appendix A.

3. Add pre-dissolved dye and continue to circulate for 10 min. Fully blend by pushing down on goods in pot, squeezing with gloved hand, and/or gentle stirring.

4. Raise temperature slowly to 175°F and hold for 10 minutes. If a thermometer is not available, the steam starts to become vigorous and curls around the edge of the pot when the temperature is around 175°F. Check pH, add small increments of acid until pH measures 4.5.

5. Raise temperature slowly to up to but not above 210°F. As soon as water becomes exhausted, remove from heat. A white plastic spoon can be helpful to check the color of the dye bath. Often if the dye bath is just slightly still colored by the time the bath cools down, the water becomes clear.

6. When cool, rinse until clear.

Dye Formulas

Section 1 - Primaries

1% Depth of Shade (DOS) unless noted

Sunset Orange

Sunshine Yellow

Flame Red

Ruby Red

River Blue

Amethyst Purple

Coral Reef Aqua

Amazon Green

Midnight Black 2% DOS

Midnight Black 1% DOS

Midnight Black 0.5% DOS

Midnight Black 0.1% DOS

Section 2 - Color Wheel

0.2% Depth of Shade

Flame Red	Sunshine Yellow	River Blue
100%	0%	0%
75%	25%	0%
50%	50%	0%
25%	75%	0%
0%	100%	0%
0%	75%	25%
0%	50%	50%
0%	25%	75%
0%	0%	100%
25%	0%	75%
50%	0%	50%
75%	0%	25%

Flame Red	Sunshine Yellow	River Blue
100%	0%	0%
75%	25%	0%
50%	50%	0%
25%	75%	0%
0%	100%	0%
0%	75%	25%
0%	50%	50%
0%	25%	75%
0%	0%	100%
25%	0%	75%
50%	0%	50%
75%	0%	25%

Midnight Black	Flame Red	Sunshine Yellow	River Blue
10%	90%	0%	0%
10%	67.5%	22.5%	0%
10%	45%	45%	0%
10%	22.5%	67.5%	0%
10%	0%	90%	0%
10%	0%	67.5%	22.5%
10%	0%	45%	45%
10%	0%	22.5%	67.5%
10%	0%	0%	90%
10%	22.5%	0%	67.5%
10%	45%	0%	45%
10%	67.5%	0%	22.5%

Section 3 – Tri-chromatic

Flame Red	Sunshine Yellow	River Blue
100%	0%	0%
80%	10%	10%
60%	20%	20%
40%	30%	30%
20%	40%	40%
10%	45%	45%

Flame Red	Sunshine Yellow	River Blue
0%	100%	0%
10%	80%	10%
20%	60%	20%
30%	40%	30%
40%	20%	40%
45%	10%	45%

Flame Red	Sunshine Yellow	River Blue
0%	0%	100%
10%	10%	80%
20%	20%	60%
30%	30%	40%
40%	40%	20%
45%	45%	10%

Section 4 – Tri-chromatic

Ruby Red	Sunshine Yellow	River Blue
100%	0%	0%
80%	10%	10%
60%	20%	20%
40%	30%	30%
20%	40%	40%
10%	45%	45%

Ruby Red	Sunshine Yellow	River Blue
0%	100%	0%
10%	80%	10%
20%	60%	20%
30%	40%	30%
40%	20%	40%
45%	10%	45%

Ruby Red	Sunshine Yellow	River Blue
0%	0%	100%
10%	10%	80%
20%	20%	60%
30%	30%	40%
40%	40%	20%
45%	45%	10%

Section 5 – Tri-chromatic

Flame Red	Sunshine Yellow	C R Aqua
100%	0%	0%
80%	10%	10%
60%	20%	20%
40%	30%	30%
20%	40%	40%
10%	45%	45%

Flame Red	Sunshine Yellow	C R Aqua
0%	100%	0%
10%	80%	10%
20%	60%	20%
30%	40%	30%
40%	20%	40%
45%	10%	45%

Flame Red	Sunshine Yellow	C F Aqua
0%	0%	100%
10%	10%	80%
20%	20%	60%
30%	30%	40%
40%	40%	20%
45%	45%	10%

Section 6 – Tri-chromatic

Ruby Red	Sunshine Yellow	C R Aqua
100%	0%	0%
80%	10%	10%
60%	20%	20%
40%	30%	30%
20%	40%	40%
10%	45%	45%

Ruby Red	Sunshine Yellow	C R Aqua
0%	100%	0%
10%	80%	10%
20%	60%	20%
30%	40%	30%
40%	20%	40%
45%	10%	45%

Ruby Red	Sunshine Yellow	C F Aqua
0%	0%	100%
10%	10%	80%
20%	20%	60%
30%	30%	40%
40%	40%	20%
45%	45%	10%

Section 7 – Jewel Tones

DOS	River Blue	Coral Reef Aqua	Amazon Green	Sunshine Yellow	Sunset Orange	Ruby Red	Flame Red	Amethyst Purple
1%	75%		25%					
1%	50%		50%					
1%	25%		75%					
1%		50%	50%					
1%			75%	25%				
1%	50%			50%				
1%			50%	50%				
1%			25%	75%				
1%	2.5%			95%			2.5%	
1%				50%	50%			
1%					75%	25%		
1%					50%	50%		
1%					25%	75%		
1%						75%		25%
1%						50%		50%
1%						25%		75%
1%	25%							75%
1%	50%							50%
1%	75%							25%
.5%		100						

Section 8 – Pastels

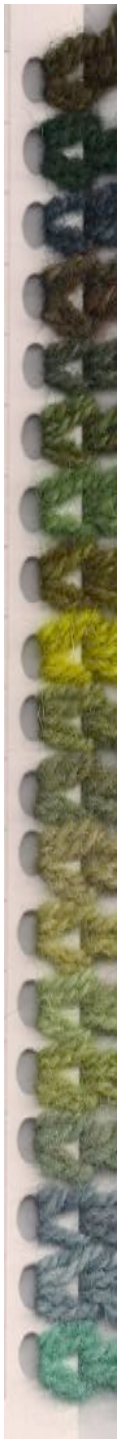
.2% Depth of Shade (DOS)					
River Blue	**Amazon Green**	**Sunshine Yellow**	**Sunset Orange**	**Ruby Red**	**Amethyst Purple**
75%	25%				
50%	50%				
25%	75%				
	100%				
	75%	25%			
	50%	50%			
	25%	75%			
		75%	25%		
		50%	50%		
		25%	75%		
			100%		
			75%	25%	
			50%	50%	
			25%	75%	
				75%	25%
				50%	50%
				25%	75%
					100%
25%					75%
50%					50%
75%					25%

Section 9 – Highlights

DOS	Coral Reef Aqua	Amazon Green	Sunshine Yellow	Sunset Orange	Ruby Red	Flame Red
1%		5%	95%			
1%			95%	5%		
1%			95%			5%
.2%	100%					
.2%					100%	
.2%	50%				50%	

Section 10 – Earth Tones

Greens									
DOS	**River Blue**	**Coral Reef Aqua**	**Amazon Green**	**Sunshine Yellow**	**Sunset Orange**	**Ruby Red**	**Flame Red**	**Amethyst Purple**	**Midnight Black**
2%	45%			45%			10%		
2%	62.5%			27.5%					10%
1%	20%		60%		5%	15%			
1%		60%		20%			20%		
1%			60%	20%		15%		5%	
1%			40%	40%		10%		10%	
1%	45%			45%			5%		5%
1%			20%	60%		5%		15%	
1%				95%					5%
.5%	45%			45%			10%		
.5%	45%			45%		10%			
.2%	45%			45%			10%		
.2%			20%	60%		5%		15%	
.2%			40%	40%		10%		10%	
.2%	35%			60%			5%		
.2%			60%	20%		15%		5%	
.2%			80%			20%			
.2%	20%		60%		5%	15%			
.1%			90%			10%			

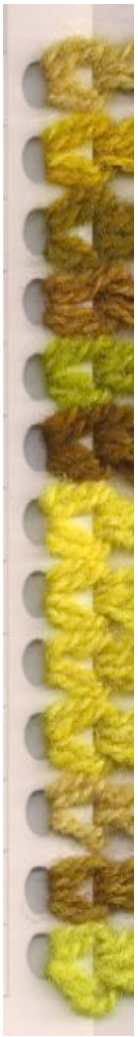


Section 10 – Earth Tones

Blues									
DOS	**River Blue**	**Coral Reef Aqua**	**Amazon Green**	**Sunshine Yellow**	**Sunset Orange**	**Ruby Red**	**Flame Red**	**Amethyst Purple**	**Midnight Black**
2%	90%			5%		5%			
1%	90%			5%		5%			
1%	80%				20%				
1%	75%			15%		10%			
1%	60%		20%		15%	5%			
1%	60%		20%		5%	15%			
1%	40%		40%			10%		10%	
1%			80%			20%			
.5%	80%			10%			10%		
.5%	60%		20%		15%	5%			
.2%		80%		10%			10%		
.2%	80%				20%				
.2%	60%		20%		15%	5%			
.2%	40%		40%			10%		10%	
.2%	80%							20%	
.2%	65%							35%	

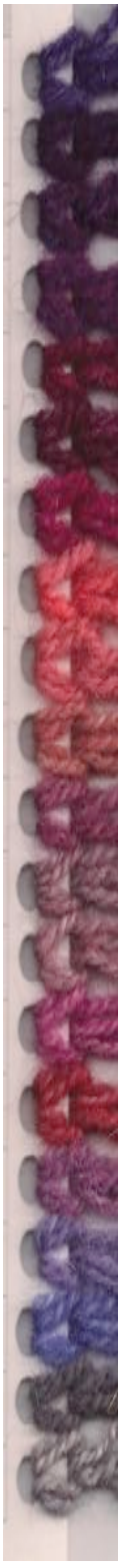
Section 10 – Earth Tones

Yellows									
DOS	**River Blue**	**Coral Reef Aqua**	**Amazon Green**	**Sunshine Yellow**	**Sunset Orange**	**Ruby Red**	**Flame Red**	**Amethyst Purple**	**Midnight Black**
1%				80%				20%	
1%				95%				5%	
1%	2.5%			92.5%			2.5%		2.5%
1%	5%			60%	20%			15%	
1%				95%					5%
.5%		20%		60%		20%			
.2%				95%	5%				
.2%				95%				5%	
.2%	2.5%			95%			2.5%		
.2%	2.5%			92.5%			2.5%		2.5%
.2%				80%				20%	
.2%	5%			60%	20%			15%	
.2%				95%					5%



Section 10 – Earth Tones

Pink to Purple									
DOS	**River Blue**	**Coral Reef Aqua**	**Amazon Green**	**Sunshine Yellow**	**Sunset Orange**	**Ruby Red**	**Flame Red**	**Amethyst Purple**	**Midnight Black**
1%	80%						20%		
1%	25%							75%	
1%		60%				40%			
1%		50%				50%			
1%			20%			80%			
1%			10%	10%		40%		40%	
.5%						80%		20%	
.2%				20%		80%			
.2%				25%		75%			
.2%	10%		10%		40%	40%			
.2%			10%	10%		40%		40%	
.2%				20%				80%	
.2%	25%			25%		50%			
.2%			20%			80%			
.2%				25%		50%		25%	
.2%		50%				50%			
.2%	80%						20%		
.2%	65%							35%	
.2%						5%			95%
.2%	40%			10%	10%			40%	



Section 10 – Earth Tones

Brown, Chocolate, Rust and Tan									
DOS	**River Blue**	**Coral Reef Aqua**	**Amazon Green**	**Sunshine Yellow**	**Sunset Orange**	**Ruby Red**	**Flame Red**	**Amethyst Purple**	**Midnight Black**
2%	32%			32%		32%			4%
1%	25%			25%		50%			
1%	10%		10%		40%	40%			
1%				20%				80%	
1%	50%			20%		30%			
1%	40%			10%	10%			40%	
1%				40%		40%	10%		10%
1%	45%			45%			10%		
1%	30%			30%		30%			10%
1%	32%			31%		25%			12%
1%	33.3%			33.3%		33.3%			
1%	20%			50%			30%		
1%		25%		30%			20%		
1%			10%		80%			10%	
1%	20%				80%				
1%	10%			40%	40%			10%	
.2%	30%			30%		30%			10%
.2%	10%			40%	40%			10%	
.2%	20%				80%				

Appendix A – I Just Want to Dye!

A Conversion Chart for Those Without an Accurate Scale

Although accurate weighing is about the only way to achieve repeatable results, for those who do not have access to a scale with a good enough accuracy, or for those who will be happy with whatever color they get, use the following information to estimate the amount of dye needed.

The following volumes will dye 1 lb of fiber a 1% Depth of Shade.

Dye	Volume
Sunshine Yellow	1 ½ tsp
River Blue	1 tsp
Ruby Red	1 ¾ tsp
Flame Red	3 tsp
Coral Reef Aqua	1 tsp
Amazon Green	1 ¼ tsp
Sunset Orange	1 ¼ tsp
Amethyst Purple	1 ¼ tsp
Midnight Black	1 ¼ tsp
Midnight Black – 2% DOS	2 ½ tsp

Appendix B - Resources

Please visit www.GreenerShades.com for a listing of retailers of Greener Shades™ dyes and other supplies in your area.