Color by Accident is designed to be used as a workbook and as a reference manual for the adventuresome. Beginning and experienced dyers will find *Color by Accident* to be an inspiring guide for creating one-of-a-kind fabrics not available commercially. It includes Five Variations on a versatile method and 54 tested recipes. **Not** required are expensive equipment, dangerous chemicals or specialized studio space. Other books teach how to repeat a method and reproduce colors. This book points the way to exploring new color combinations and to achieving fabric that will be unique and visually complex.

"A wonderful textbook reflecting years of practice and experimentation! Clear. Concise. Well thought out...and easy to understand. The recipes have been tried over and over again until they have proven to give great results. Readers will begin to see the enormous flexibility in all of these approaches to dyeing while at the same time gaining a much deeper understanding of the nature of dyeing.

This book will become a classic for anyone wanting to create their own vocabulary of fabrics." —*Nancy Crow, Baltimore, OH*

"Ann has changed the face of quiltmaking with her innovative combinations of painting and piecing. In her new book, *Color by Accident*, she explores an exciting and unpredictable approach to immersion dyeing in which colors move and blend and are always a revelation to the artist." —*Jean Ray Laury, Clovis, CA*

"Ann Johnston's *Color by Accident* is worth every penny! It offers a rare opportunity to discover the hard-earned color dye bath secrets of an artist who is a leading force in the newly emerging surface design movement in contemporary quilts. Each of her color recipes is presented in detailed, easy-to-follow steps. For the price of the book you get Ann teaching you your own personal workshop. If you've ever wondered how to add a rich new dimension to your quiltmaking, you should read this book." —*Penny McMorris, Bowling Green, OH*

How is *Color by Accident* different from other dye books?

- The approach is spontaneous.
- The small amount of water used makes dyeing easy.
- The recipes can be adapted to fit any schedule.
- No salt is required.
- The results are one-of-a-kind.

Ann Johnston
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COLOR BY ACCIDENT

LOW-WATER IMMERSION DYEING

ANN JOHNSTON

This PDF is a copy of the sixth and last printing of Ann's 1997 book, ***Color By Accident: Low-Water Immersion Dyeing***, now considered a basic textbook for all dyers.

Ann has replaced this book with an updated version, as a 4.5 hour DVD called ***Color by Accident: Exploring Low-Water Immersion Dyeing***. The first chapter of the DVD contains all the information in this PDF, plus the DVD offers 15 subsequent years of experience with variations of LWI and 17 live demonstrations.

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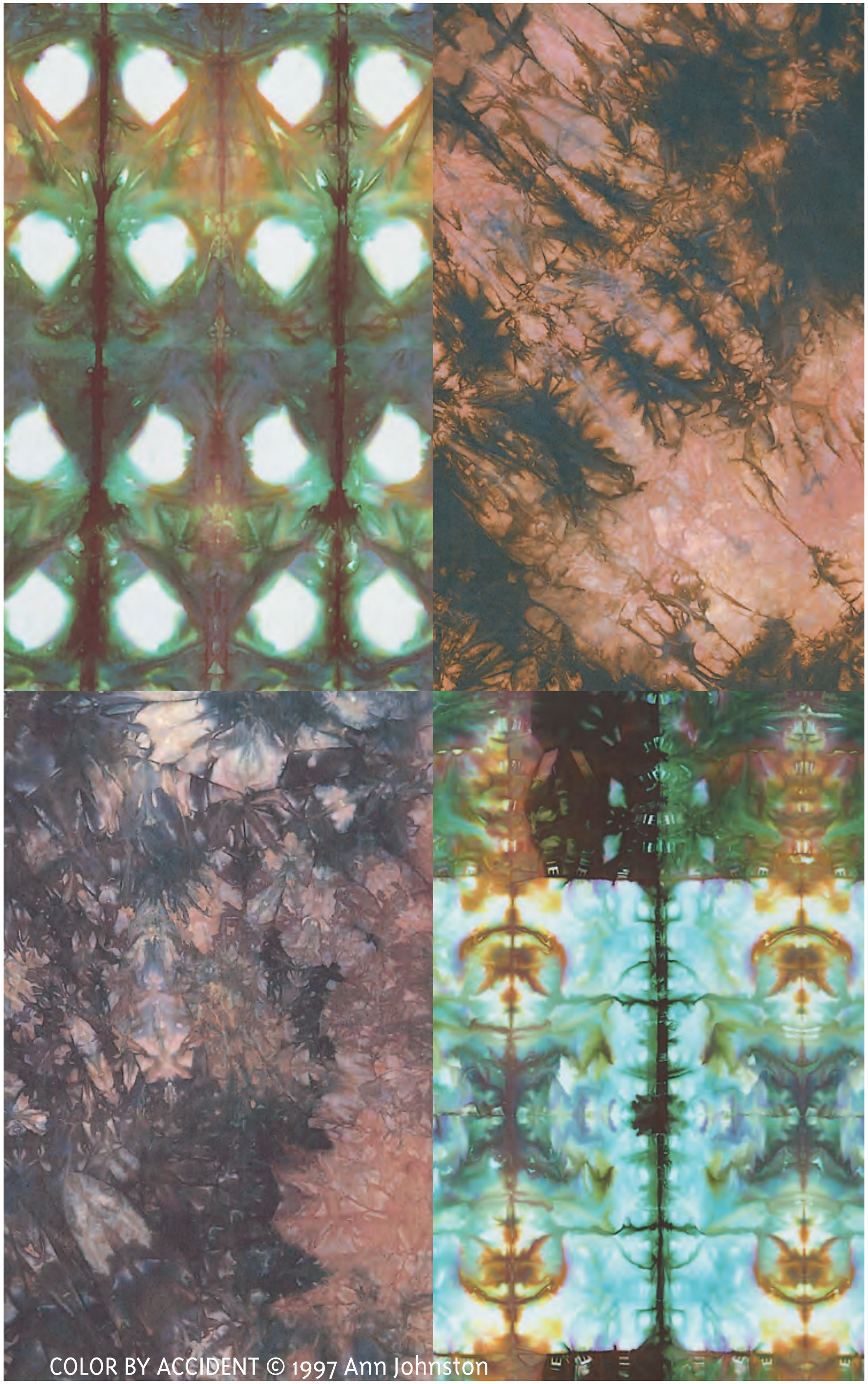

COLOR BY ACCIDENT

LOW-WATER IMMERSION DYEING

ANN JOHNSTON

Ann Johnston, Publisher
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Color By Accident:
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Immersion Dyeing

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Dedication:
To Jim

Acknowledgements:
Nancy Crow encouraged me to explore more ways of dyeing fabric.
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Alice Greene contributed her energy and time to help market this book.
Many students and friends wanted this book now and gave me advice on how.

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CHARTS AND PHOTOGRAPHS

INSIDE COVER:	A sample from each recipe in the book.
FRONTISPIECE:	Clockwise from upper left:
	Green/ochre, Variation #3, clamped with plastic shapes, cotton.
	Orange/brown, Variation #2: silk.
	Green/turquoise, Variation #3: folded with clothespins, cotton.
	Black/tan, Variation #2: cotton.

INTRODUCTION

I have written this book to show you how easy it is to dye one-of-a-kind fabric colors. It's simple, it's fast, it's safe, and it's fun. I hope it will be a jumping-off place for both beginners and experienced dyers who are willing to explore. To avoid confusion, I will give all the information as if you were a first time dyer. There are as many ways to manipulate the fabric and mix the colors as there are dyers. The five variations detailed in this book are all really the same recipe. By the time you practice them a few times, you will think of your own variations.

There are basically two ways to dye fabric with fiber-reactive dyes: immersion dyeing (lots of water) and dye painting (almost no water). The standard recipe for **immersion dyeing** uses twenty times the amount of water as fabric (by weight). That is, one pound fabric would use twenty pounds of water or about 2½ gallons. Salt is used in the water to force the dissolved dye onto the fabric and soda ash is used as the fixative. Like water in the standard recipe, the amounts of soda and salt are also determined by the weight of the fabric being dyed. Time is an important part of this recipe. It takes time for the dye to distribute itself through the fabric and time for the chemical bonding to occur—about 1¼ hours altogether. This recipe can be adjusted for dark, medium, and light colors, using more salt and soda proportionally when more dye is used. This standard recipe makes efficient use of the dye in a fairly short time. Its directions for frequent stirring and precise timing of the addition of salt and soda are designed to produce even, solid colors. It appears in Appendix I for your reference.

Dye painting is a method for applying fiber-reactive dyes directly to the fabric using almost no water. The dye can be used thin, mixed with water; it can be used thick, mixed with a gel; or it can be used in any consistency in between. This means that all of the traditional surface design techniques such as silk screening, brush painting, stamping, and monoprinting can be used. Because the dye is applied directly to the fabric, salt is not needed. Soda ash is used as the fixative just as in immersion dyeing. Time is also a factor; the dye/fiber reaction takes longer with direct application to the fabric. The fabric should be left to cure for 4 to 8 hours. I have included the recipes for the mixtures needed for dye painting in Appendix II of this book for your convenience. For further information see my book *Color by Design* published in 2001.

Both immersion dyeing and dye painting can be laborious, either hauling heavy buckets with gallons of water in them, or leaning over a table for hours, printing or painting a particular design. Each method has its advantages and I use them accordingly.

I have now come to a middle ground between these two recipes. I call it **low-water immersion dyeing**. I consider low-water immersion dyeing a third option for quick, easy dyeing of multicolored fabrics. It uses about one quarter the amount of water as in the standard immersion dyeing recipe and the same dye concentrates and soda solution as in dye painting. Reducing the quantity of water reduces the work considerably and encourages the wrinkling and twisting of the fabric that influences the way the dye fixes and mixes in the fabric. In fact, a low ratio of water to fabric allows for the elimination of salt in the recipe. The use of liquid solutions of soda and dye reduces exposure to chemicals in powder form. Because these solutions of soda and dye concentrates are the same as for my dye painting recipes, it is very convenient to combine dye painting and low-water immersion dyeing.

Color by Accident is a simple and exciting way to dye fabric. The results are unlimited variations of color and value—your own one-of-a-kind fabrics. Following these recipes, you will create beautiful accidents of color. You will think of more variations of your own and at the same time begin to discover the infinite combinations of color. Have fun!

BACKGROUND

ABOUT FIBER-REACTIVE DYES

Fiber-reactive dyes are one of many classes of dyes available to the studio artist. They are considered the most versatile, economical, safe, and easy to use. Fiber-reactive dyes are synthetic dyes for natural fibers: cotton, rayon, linen, silk. The dye molecule contains reactive groups that chemically join with the fiber molecules. The reactive dye/fiber union involves electron sharing, which is the strongest type of chemical bonding that can occur. As a result, the bond is insoluble in water and gives these dyes very good wash fastness. They can be used for immersion dyeing or they can be applied directly to the fabric. Neither process leaves a surface texture on the fabric. Fiber-reactive dyes also offer bright colors, a full color range, good mixing ability, even dyeing ability, and good fastness to light. After dyeing, repeated rinsing and soaping are required to ensure complete removal of excess dye so that no bleeding will occur during later washings. For safety purposes, a dust mask and gloves should be used when measuring the dye powder or spraying liquid dyes—none should be inhaled. The most often used fiber-reactive dyes are Procion®MX, Procion®H, Liquid Reactive, and Cibacron®F. Each requires different conditions for maximum reaction of the dye and fiber, so it is important to know which dye you are using. The recipes in this book all use Procion®MX dyes which react at room temperatures.

ABOUT PROCION® MX DYES

Procion® MX dyes are more reactive than the other types of fiber-reactive dyes, requiring only room temperature to bond with the fibers. They do not need to be steamed or heated to fix the color in the fiber. A concentrated solution of each MX dye color can be mixed and stored at room temperature, and thus frequent mixing of the powders can be avoided. Because they are so reactive, they will gradually lose their strength at room temperature after 5 to 7 days. Below room temperature, they will last longer. Once the dye powder is in a concentrated liquid, it is easy to use and measure in large or tiny quantities for color mixing. With Procion® MX dyes, the same recipes can be used for cotton, silk, viscose rayon, and linen, and can be adapted to almost all surface design techniques.

ABOUT SODA ASH

Soda ash is a fixative for Procion® MX dyes; sodium carbonate is its chemical name. It will dissolve best in hot water, but the solution should be used at room temperature. When it is present with the dye in water, it very quickly causes the dye to bond with the water or with the fabric. If the soda is left in solution with the dye for over an hour, there will be little or no dye left to bond with the fabric. The dye will then act as a direct dye to stain the fabric and direct dyes have very low wash fastness. The shelf life of a dye/soda ash solution is about fifteen minutes at full reactivity. If there is no fabric present, after an hour in the water with soda, 60% to 90% of the dye will have reacted with the water. The solution of soda and water without dye can be stored and used indefinitely. Just keep in mind that it should be at

room temperature when used in the low-water immersion method.

ABOUT SALT

Salt is not the fixative for Procion® MX dyes. These dyes bond to fabric without salt in dye painting; they also bond to fabric without salt in low-water immersion dyeing. When a large quantity of water is used as in the standard immersion recipe (20 times the weight of water to the weight of fabric), salt is necessary to help get the dye out of the water and onto the fabric because it changes the electrical charge on the molecules. The standard immersion dye recipe calls for a solution that has the weight of salt equal to the weight of fabric to be dyed, and more salt is used when more dye is used for darker colors, otherwise the dye would be wasted in the water. For example, in the standard recipe, 1 yard of fabric would use ½ to 1 cup (120-240 ml) salt.

ABOUT UREA

Urea is a chemically formulated nitrogen compound that acts as a moisturizing agent. It is present in many everyday products such as hand lotion. It draws in moisture and for that reason it is used in the print mix recipes for dye painting. Urea is also in the dye concentrate recipe because its presence in water allows more dye to be dissolved in a smaller amount of water than without urea. Thus, a more concentrated solution of color can be made than would be possible without urea. As the urea dissolves, the water cools, so always use hot water to thoroughly dissolve it.

ABOUT SAFETY WITH CHEMICALS

We will be using Procion® MX dyes for safety as well as for convenience. These dyes and their auxiliaries, like many of the household products we use, are safe when handled properly. The dye powders are ground very finely and they float and spread with the slightest air movement. To avoid inhaling any powders, wear a dust/mist mask approved for fine particles when measuring powdered dyes. Always cover containers holding dye powder immediately after use. To avoid contact of the powders with your eyes, use goggles or glasses. Using a dye/water concentrate minimizes contact with the airborne dye powders. Avoid contact with the skin by using gloves. Work carefully: a spill is not hazardous, but it is a mess. Clean up as you work. All containers and measuring tools should be reserved for use only with chemicals. Label the containers, do not store with food and always keep all chemicals out of the reach of children. In the amounts we use, it is safe to dispose of dyes and their auxiliaries in your home sewer and municipal waste systems.

ABOUT WATER

Water is used to carry and spread the dye on the fabric. In immersion dyeing when even color is desired, two to three gallons of water and almost continuous agitation are required for every 3-4 yards of fabric. If texture and uneven coloring is the goal, the quantity of water can be greatly reduced, and the amount and type of agitation can be varied according to the desired results. In low-water immersion dyeing, using much less water changes the way the dye flows through the fabric, creating variegated colors and values. Also when less water is used, less dye is needed, which is especially useful when dyeing dark colors. Almost no water is used in dye painting. The dye is put in place with or without a thickening gel and it will migrate through the fibers according to the consistency

of the mixture. The kind of water you use may affect your colors slightly, but I have used tap water everywhere I have lived: well water, spring water, softened water, bad tasting water, and chlorinated water. Because we are not matching dye lots with this method, it all works.

ABOUT TEMPERATURE

Procion®MX dyes require room temperature to be properly fixed in the fabric. They react faster with the water and lose strength if they are dissolved above 95°F (35°C). Each color has its own characteristics; for example, some colors dye darker values at higher temperatures, but the temperature range of 70-110°F (21-43°C) is a general rule that will work with all the colors. Procion®MX dyes can be stored, mixed with water, without soda for about a week at room temperature, and even longer if kept below room temperature. Refrigeration works to lengthen the shelf life of the dye/water solution, but the dyes do need to reach the room temperature range to fix with the fibers. Likewise, temperature is important in washing out any dye that has not fixed in the fabric, the final step. Any dye that has not fixed is not light or wash fast. Complete wash-out of all excess dye requires very hot water, 140°F (60°C), in addition to the work done by agitation and a surface active agent such as Synthrapol SP or a pH-neutral detergent.

ABOUT TIME

Procion®MX dyes need time to spread through the fibers and to react with them. Immersion dyeing uses a high ratio of water to dye and requires a minimum of 10 minutes to allow the dye to penetrate the fibers and a minimum of one hour for the dye to react. Painting Procion®MX dyes directly onto the fabric with the soda already present (using relatively very little water) requires a minimum of four hours at room temperature to get maximum color. Low-water immersion dyeing works well in the same time frame as the standard immersion recipe: 1¼ to 1½ hours total. With all of these dyeing methods, the dye solution itself will keep its strength a very limited time after soda has been added to it.

ABOUT FABRIC

The kind of fabric you use for dyeing is critical to the results you achieve. MX dyes are designed for cellulose fibers: cotton, linen, and rayon (viscose rayon is made from wood fibers). They will also dye silk. Silk is a special fiber that can be dyed using acid or alkali as a fixative. All the recipes for MX dyes using soda ash as a fixative work fine on silk. Be aware that different fibers result in different colors using the same dye color. The difference between cotton and silk can be dramatic, depending on which dye colors were used.

Other attributes of the fabric also influence your results. The weave of the fabric, which you can see, and the way the fabric has been processed, which you cannot see, will influence color intensity and detail of texture. For cotton, the brightest colors with the most detail are achieved with a mercerized fine broadcloth that has no sizing or wrinkle-free treatments. Of course, any color on the fabric will influence the final dyed color. Even off-white, unbleached cotton will give a different final color than will bleached, white cotton. If you have a particular type of fabric you want to sew with, dye some of it to test the results. If you do not like the results, try another type of fabric. A frequent problem for dyers,

the colors not being dark enough, can often be solved by using a mercerized cotton. Mercerization is a process using caustic alkali on the fiber when it is under tension. It makes the fabric look and feel more lustrous and results in colors that appear more intense. Because it is an extra processing step, mercerized fabric costs more.

"PFD" means "prepared for dyeing," that is, it has no surface treatments that will interfere with the dye process. "PFD" is sometimes used to mean that the fabric is treated with a caustic alkali similar to the mercerization process. It does NOT mean that the fabric has soda ash or another fixative on it.

ABOUT COLOR

The following color information will help you as you dye fabric. The details become clear as you work and observe! Dye these colors as in the recipes in Exploring Color (page 33) and use swatches to make your own color chart.

Primary colors: The three basic colors from which all others are theoretically derived. For the dyer they are blue, red, and yellow.

Secondary colors: These are the colors made by combining two primaries. Blue and yellow make green. Red and yellow make orange. Red and blue make violet.

Tertiary colors: These are colors between a primary and its adjacent secondary color. They are yellow-orange, red-orange, red-violet, blue-violet, blue-green and yellow-green.

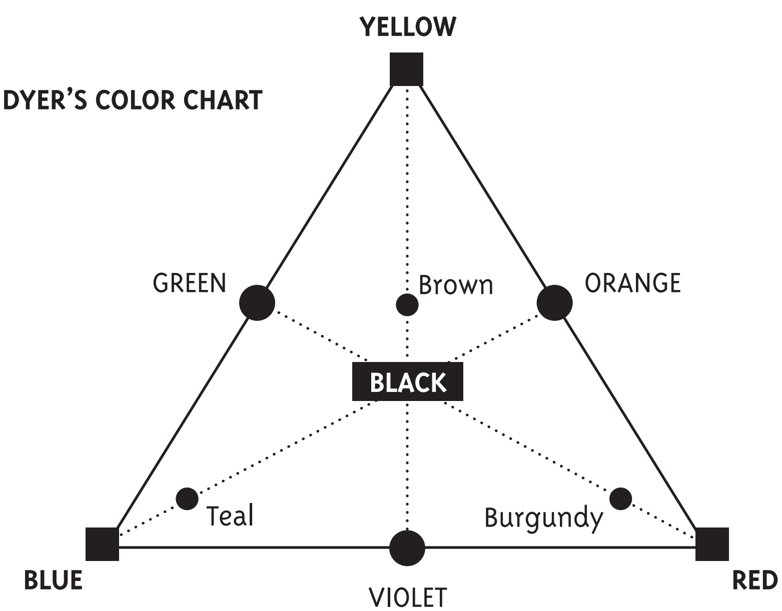
Complementary colors: These are colors opposite to each other on the color chart. The complements of the primary colors are secondary colors: blue and orange, red and green, yellow and violet.

Grayed colors: These colors are of lower intensity or saturation, having less of the pure primary color by the addition of other colors. Burgundy, teal, and brown are shown as examples inside the triangle below. In this book they are made by combining one color and its complement or by adding black.

Neutral colors: In this book I refer to gray and black as neutral colors, made by combinations of all three primaries.

Color value: This refers to the degree of lightness or darkness of a color.

A DYER'S COLOR CHART



SUPPLIES

DYES

When you buy dye, it usually comes packaged with the color name and number of the dye distributor or craft company that packages it, but each different dye has been assigned its own individual number by the manufacturer. ASK FOR THIS NUMBER WHERE YOU BUY YOUR DYE. Then you know exactly what color you are buying. It is critical that you buy Procion®MX dyes, not Procion®H dyes which work differently. Procion®MX dyes are sold in many mixed colors, but there are only a dozen or so single-chemical colors, or "self-dyes," currently available. Buying larger quantities of a few single-chemical colors makes it more economical and easier to repeat previously mixed colors. Select from the following list of colors for the recipes in this book. The exact colors I used are in **bold.**

TABLE A: DYE COLOR NUMBERS

Manufacturer's #	Dharma #	Pro Chem #
Black MX-CWNA	300	608
***Black**	**44**	**602A**
Blue MX-R	26	400
Blue MX-G	23	406
Blue MX-2G	22	402C
Turquoise MX-G	**25**	**410**
***Blue**	**--**	**404**
Brown MX-5BR	36	505
Gold MX-3RA	**4**	**104**
Orange MX-2R	**6**	**202**
Red MX-5B	12	305
Red MX-8B	**13**	**308**
Yellow MX-4G	--	114
Yellow MX-8G	**1**	**108**

**Colors listed without MX are not mixed by the manufacturer.*

AUXILIARY CHEMICALS

Soda ash:	100% sodium carbonate
Urea:	a nitrogen compound
Synthrapol SP:	a concentrated surface active agent for washing

TABLE B: AMOUNTS FOR ALL RECIPES

This is an approximate list of what you will need to dye all the recipes in *Color by Accident*. These recipes use dye powder in tablespoons, but it is usually sold by weight. You may want to do pieces smaller than one yard but the time and mess will be the same. NOTE: Wider or heavier fabric requires more dye.

	US	METRIC
Dye Powder		
Black	4 oz	120 g
Blue	8 oz	230 g
Gold	2 oz	60 g
Orange	2 oz	60 g
Red	8 oz	230 g
Turquoise	2 oz	60 g
Yellow	8 oz	230 g
Soda ash	2 lb	910 g
Urea	5 lbs	2.5 kilos
Synthrapol SP	2 cups	480 ml
Fabric, 45 in (115 cm) wide	54 yards	54 meters*

**The difference between one meter and one yard will not impact your results when you dye fabric this way. All the measurements are guides, not precision formulas.*

MISCELLANEOUS SUPPLIES

Mask, NIOSH/MSHA approved for dust and mist

Safety goggles or glasses

Rubber gloves

Several 2-cup (500 ml) plastic measures

Plastic measuring spoons

Small plastic mixing spoons

Long handled, heavy duty plastic spoons

Six or more 1- to 2-quart (1-2 liter) plastic canisters or buckets for dyeing fabric

Two or more 1- to 2-gallon (4-8 liter) plastic canisters or buckets for dyeing fabric

Two 2-gallon (8 liter) plastic buckets for soda solution and plain water

Several flat, shallow plastic basins or storage boxes, size range: 5 x 14 in to 15 x 22 in (12 x 35cm to 35 x 55cm)

Seven or more 8-ounce (250 ml) plastic squeeze bottles with pointed tips, caps

Seven or more wide-mouth plastic pint or quart (500 ml or 1 liter) bottles to mix and shake dyes

Plastic funnel

Rubber bands

Plastic clothespins

Heavy-duty spring clamps

Plastic shapes for clamps, optional

LOW-WATER IMMERSION DYEING

GENERAL METHOD 5 STEPS

The proportions in this low-water immersion dyeing method are based on one-yard (meter) pieces, 45 inches (115 cm) wide, average weight. About 3 cups (720 ml) liquid per yard (meter) of fabric are used. This small amount of water allows a more efficient use of the dye, and also causes the dye to flow unevenly in the fabric creating one-of-a-kind colors. No salt is needed with this low ratio of water to fabric. All the variations detailed in the next section follow the five steps below.

1. Prepare fabric pieces.
2. Prepare liquid dye concentrates.
3. Prepare soda solution.
4. Dye fabric.
5. Remove excess dye.

PREPARE THE FABRIC

Almost all cotton in the fabric stores has a coating of sizing that prevents the dyes from penetrating completely into the fibers. This fabric has to be scoured (washed thoroughly in hot water and detergent). Wrinkle-free treatments cannot be washed off. Fabric without surface treatments is available from special suppliers, some of whom are listed in Appendix IV. This fabric does not have to be scoured before dyeing. All silk should be scoured to remove any gum residue.

To scour 1 pound of fabric, 3-4 yds (3-4 m), wash for 15 minutes in:

Hot water, over 140°F (60°C)	
Soda ash	½ tsp (2.5 ml)
Synthrapol SP	½ tsp (2.5 ml)

Rinse well, and dry.

Tear the fabric into the size pieces you will be dyeing.

PREPARE THE LIQUID DYE CONCENTRATES

Use warm water to dissolve the urea first, then add dye powder. Do not dissolve dyes in water over 95°F (35°C) because hot water will reduce the reactivity of the dye.

Water	1 cup (240 ml)
Urea	2 to 4 Tbs (30 to 60 ml)
Dye	2 Tbs (30 ml)*

**Use DOUBLE black dye powder: 4 Tbs (60 ml)*

Dye concentrates will keep at room temperature about a week. Warmer temperatures cause the dye to react more quickly with the water, so storing dye concentrates at cooler temperatures does extend their shelf life. They will still gradually lose their ability to react with the fabric, and should always be used at room temperature.

Be sure to follow safety rules: use gloves and wear dust/mist mask when measuring powders. Always keep covers on dye powders.

PREPARE THE SODA SOLUTION

Dissolve soda ash in warm to hot water. Use while at room temperature for best results.

Soda ash	9 Tbs (135 ml)
Water	1 gallon (3.8 liters)

DYE THE FABRIC

1. Wet the fabric with warm water, about 1 cup (240 ml) per yard (meter) of fabric. Manipulate the fabric in a container: wrinkle, fold, twist, or tie as desired.
2. Mix prepared liquid dye concentrates with plain water to make 1 cup (240 ml) liquid for each yard of fabric.
3. Pour the color over the wet fabric. Press out some of the air bubbles and mix. Manipulate the fabric as you wish; more movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution per yard (m) over the fabric. Mix or press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Press, stir, or turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color. Options are to press out most of the air bubbles and weight the fabric down so it doesn't float in the container, or after some time has passed, redistribute the wrinkles in the fabric, tie or untie it, stir continuously, or just leave it alone.

REMOVE EXCESS DYE

1. Remove soda ash and some of the extra dye by rinsing in warm water several times, by hand or in the washing machine.
2. Then wash in hot, 140°F (60°C) water and Synthrapol SP. Rinse. Use 1-2 Tablespoons Synthrapol (15-30 ml) per wash load.
3. Dark colors need even more washing to remove excess dye. Test color fastness by ironing wet over white cotton.

TABLE C: QUANTITIES OF FABRIC AND DYE

The recipes in this book are based on multiples of one yard (one meter) of 45 inch (115 cm) wide fabric. If you wish to use larger or smaller pieces, multiply or divide the amounts proportionally. See chart below. Just remember that it takes the same amount of time and mess to do quarter-yard pieces as it does to dye one-yard pieces. The amounts of soda solution, dye concentrate, and plain water used are proportionate to the amount of fabric dyed. All measurements are approximate.

FABRIC		PLAIN WARM WATER		DYE CONCENTRATE AND WATER		SODA SOLUTION	
¼ yard	(25 cm)	¼ cup	(60 ml)	¼ cup	(60 ml)	¼ cup	(60 ml)
½ yard	(50 cm)	½ cup	(120 ml)	½ cup	(120 ml)	½ cup	(120 ml)
1 yard	(1 m)	1 cup	(240 ml)	1 cup	(240 ml)	1 cup	(240 ml)
2 yards	(2 m)	2 cups	(480 ml)	2 cups	(480 ml)	2 cups	(480 ml)

FIVE VARIATIONS

These five variations use the prepared liquid dye concentrates and soda solution (page 24) and the general dye process described on page 25. Each creates different results in the way the colors mix in the fabric. Please consider these as guidelines, not rules.

1 ONE LAYER, ONE COLOR

Dye one piece of fabric one color, with value and texture variations created by folds and wrinkles.

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Wrinkle and press the fabric into the bottom of a container.
2. Mix dye concentrates with plain warm water to make 1 cup (240 ml) liquid.
3. Pour color over the fabric. Press out some of the air bubbles, lift and press again. More movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric. More movement of the fabric will make a more even color.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of fabric will make a more even color.
6. Remove excess dye. See page 25.

2 BOUND AND UNBOUND

Dye one piece of fabric by pouring color on at different times, creating overlapping textures.

1. Dip 1 yd (1 m) of fabric in plain warm water. Wring out and bind with 2 or 3 rubber bands and place in container.
2. Mix dye concentrates with plain warm water to make 1 cup (240 ml) liquid.
3. Pour color over the fabric. Squeeze the fabric bundle a few times so that some of the dye will penetrate to the middle.
4. After 10-15 minutes, pour 1 cup (240 ml) warm soda solution over the bundle. Press to distribute soda ash through the fabric. Take off the rubber bands and rearrange the whole piece of fabric. Put the rubber bands on again or press the fabric tightly into the bottom of the container.
5. Wait 5-15 minutes.
6. Mix more dye concentrate into 1 cup (240 ml) warm soda solution and pour immediately over the fabric. Lift and press to distribute the soda ash and dye and to remove some of the air bubbles.
7. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
8. Remove excess dye. See page 25.

In this variation, the second color is added directly to the soda solution, keeping the amount of water down. Be sure to pour the dye/soda mixture over the fabric immediately because the dye in the soda will lose its strength very quickly.

3 ONE LAYER, SEVERAL COLORS

Dye one piece of fabric by pouring two or more colors on different parts of the fabric. This is a good way to create color changes across the width or length of the fabric.

1. Arrange 1 yd (1 m) of fabric into a flat container. Pour 1 cup (240 ml) plain warm water over the fabric, press to moisten, and rearrange wrinkles as you wish.
2. Make two or more colors in separate cups using dye concentrates and plain warm water. Use 1 to 2 cups (240-480 ml) liquid total. Pour colors over different parts of the fabric.
3. Mix and press out some of the air bubbles. More movement of the fabric will make a more even color. The colors can be kept somewhat separate or blended completely, depending on what you do at this stage.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Press, stir, or turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
6. Remove excess dye. See page 25.

You will see the colors mix as you pour, but the way the color blends on the fabric will be determined more by the way you mix and press the fabric during dyeing. Pay attention to the dye color on your gloves. You may unintentionally pick up color from one end of the basin and press the fabric at the other end, changing the color in the process.

4 VALUE PARFAIT

Dye several pieces of fabric in the same container. The first piece of fabric will be the darkest. The subsequent pieces, stacked in the container in layers, will each be lighter depending on how long you wait.

1. Wet 1 yd (1 m) of fabric in warm water, squeeze out some excess, and arrange in a deep container.
2. Mix dye concentrates with plain warm water to make 1 cup (240 ml) liquid.
3. Pour color over the fabric. Mix and press out some of the air bubbles.
4. Pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain water and arrange on top of first layer. Pour 1 cup (240 ml) warm soda solution over this layer. Mix or press to distribute the soda ash through the fabric.
6. After 5-10 minutes, wet a third yard of fabric in plain warm water and arrange on top of the second layer. Pour 1 cup (240 ml) warm soda solution over this layer. Mix or press to distribute the soda ash through the fabric.
7. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time.
8. Remove excess dye. See page 25.

The timing is flexible in Variations 4 and 5. You can wait 5-10 minutes after adding color to add the soda as in the other recipes. You can add the soda right away and then wait. Or you can wait before and after the soda is added. Try it to see the differences.

Remember: At steps 3-7, the more you manipulate the fabric, the more evenly the dye will be distributed. If you want a lot of variegation, press once firmly at each step and no more.

5 COLOR PARFAIT

Dye several pieces of fabric in the same container. The colors you create will be a surprise as you lift off each layer of fabric.

1. Wet 1 yd (1 m) of fabric in warm water, squeeze out some excess, and arrange in a deep container.
2. Mix dye concentrates with plain warm water to make 1 cup (240 ml) liquid.
3. Pour color over fabric. Mix and press out some of the air bubbles.
4. Pour 1 cup (240 ml) warm soda solution over fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Pour 1 cup (240 ml) dye concentrates mixed with plain warm water over the second layer. Mix slightly.
6. Pour 1 cup (240 ml) warm soda solution over this layer. Lift this layer slightly and press to distribute the soda.
7. After 5-10 minutes, wet a third yard of fabric in plain warm water and arrange on top of the second layer. Pour 1 cup (240 ml) dye concentrates mixed with plain warm water over the third layer. Mix slightly.
8. Pour 1 cup (240 ml) warm soda solution over this layer. Lift slightly and press.
9. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time.
10. Remove excess dye. See page 25.

Every time you add color or soda you should mix to distribute them through the fabric (steps 3-9). If you keep the fabric in layers and do a minimum of mixing, you will have distinctly different colors. If you stir and rearrange the folds, the colors will be more alike and markings will be more subtle.

If you do not know what the MX primary colors look like, start with Know Your Primary Colors (page 35). Each dye color has different characteristics which you will observe and learn the more you dye fabric. For example, MX Red 8B works faster than other colors, and it is very strong. Some of these mixing characteristics are observable when you dye the fabrics in Mix Two Primary Colors (page 41). If you want to practice mixing grayed colors, that is, less intense, duller colors and neutrals, go to Mix Three Primary Colors (page 47).

REMEMBER, WE ARE HAVING FUN HERE!

The recipes are **approximate** amounts. DO NOT be overly concerned about exact amounts. The values and colors will be more affected by the amount of stirring and subsequent distribution of dye on the fabric than they will be by precision measuring. One piece will have very dark areas and big white patches, for example, if it is tightly bound and crushed, but if it is let loose in the container and stirred more, the overall color will be more of a medium value.

The container sizes are suggestions. You will have different results with different size containers. More color variegation and light areas occur with tighter fit of fabric in the container. For smaller amounts of fabric, use smaller containers, less dye, water, and soda. See Chart C, page 26. For lighter colors use much less dye. See the charts on the next page.

TABLE D: AMOUNTS FOR 1 YARD (1 m)

COLOR VALUE	FABRIC	SIZE OF CONTAINER	PLAIN WATER	DYE CONCENTRATE*	SODA ASH SOLUTION
Dark	1 yd (1 m)	1 qt (960 ml)	1 C (240 ml)	8 Tbs (120 ml)	1 C (240 ml)
Medium	1 yd (1 m)	1 qt (960 ml)	1 C (240 ml)	3 Tbs (45 ml)	1 C (240 ml)
Pale	1 yd (1 m)	1 qt (960 ml)	1 C (240 ml)	1 tsp (5 ml)	1 C (240 ml)

*plus water to total 1 cup

TABLE E: AMOUNTS FOR ¼ YARD (25 cm)

COLOR VALUE	FABRIC	SIZE OF CONTAINER	PLAIN WATER	DYE CONCENTRATE*	SODA ASH SOLUTION
Dark	¼ yd (25 cm)	1 C (240 ml)	¼ C (60 ml)	2 Tbs (30 ml)	¼ C (60 ml)
Medium	¼ yd (25 cm)	1 C (240 ml)	¼ C (60 ml)	2 tsp (10 ml)	¼ C (60 ml)
Pale	¼ yd (25 cm)	1 C (240 ml)	¼ C (60 ml)	1 drop	¼ C (60 ml)

*plus water to total ¼ cup

KNOW YOUR PRIMARY COLORS

The Procion® MX series of dyes has more than one of each of blue, red, and yellow that are single-chemical colors. Buy from the list in Table A: Color Numbers (page 19). In order to know what each of the primary colors looks like that you have purchased, you will dye two values of each using Variation #1: One Layer, One Color in the recipes that follow.

Have these ready before you start. There will be leftovers. Refer to page 24 for mixing dye concentrates and soda solution.

- Liquid dye concentrates:
  - Blue 1 cup (240 ml)
  - Red 1 cup (240 ml)
  - Yellow 1 cup (240 ml)
- ½ gallon (1.9 liters) warm soda solution
- 1 gallon (3.8 liters) warm water
- Containers:
  - Six 1- to 2-quart (1-2 liter) canisters
- Six 1 yard (1 meter) pieces of fabric

BLUE

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Blue 8 Tbs (120 ml)
3. Pour color over the fabric. Press out some of the air bubbles, lift and press.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

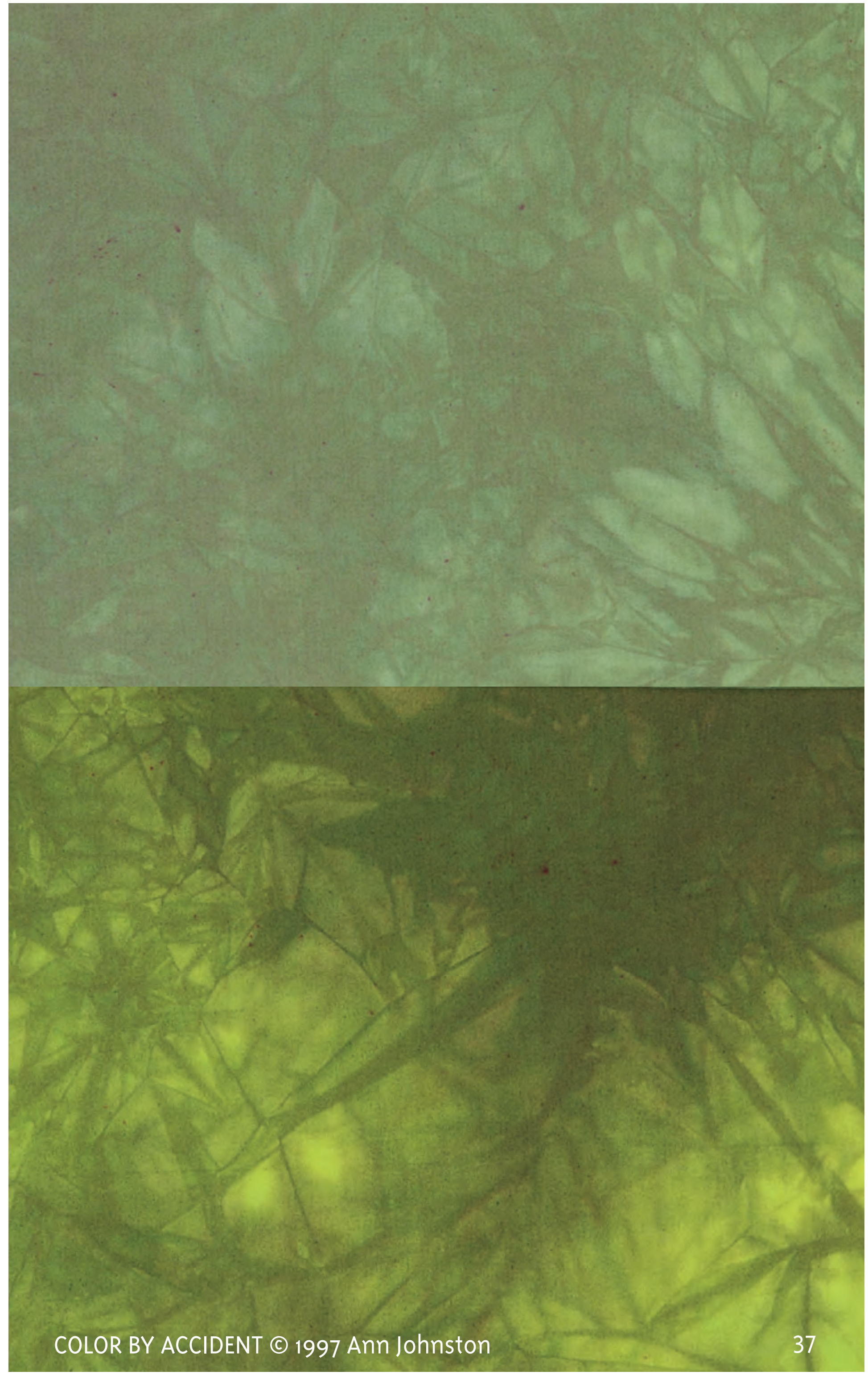
Remember it's okay to leave the fabric in the dye/soda solution longer if you need to.

LIGHT BLUE

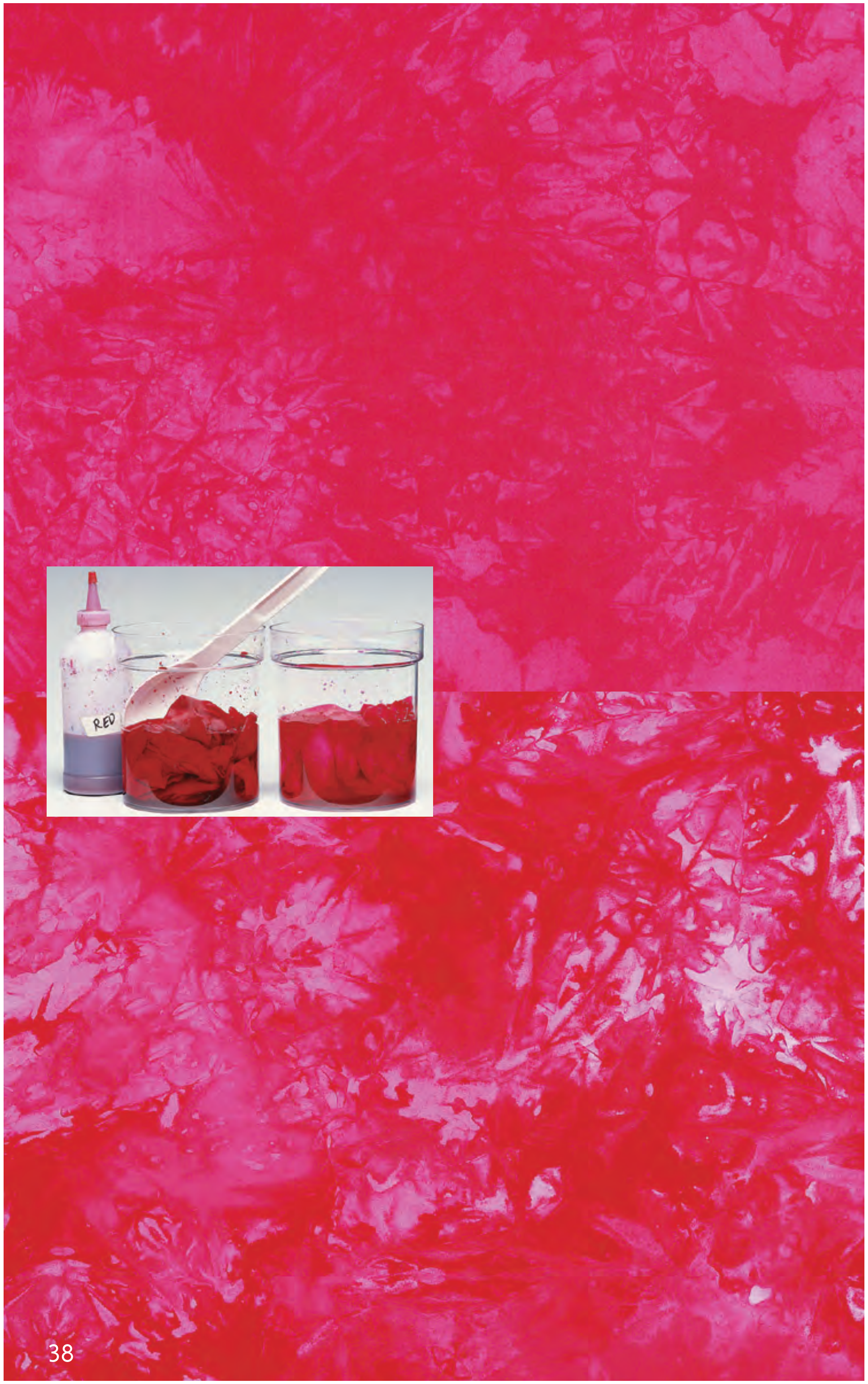
1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Blue 1 Tbs (15 ml)
3. Pour color over the fabric. Press out some of the air bubbles, lift and press.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

At steps 3-5, mix very slightly or not at all to get distinct value markings on each piece of fabric. More movement of the fabric will make more even colors.



Two pieces of fine cotton broadcloth; the one with brighter colors is mercerized, the other is not.



Red, Variation #1: One Layer, One Color, shown in progress; top sample is stirred slightly, bottom sample is not stirred at all.

JUDGING VALUE IS TRICKY WHEN THE FABRIC IS WET. Take a piece of dark colored cotton and dip part of it in water. Note the difference in value between the wet and the dry parts. Every time you dye a piece of fabric, you need to remember that its true value appears when the fabric is thoroughly washed and DRY.

RED

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Red 8 Tbs (120 ml)
3. Pour color over the fabric. Press out some of the air bubbles, lift and press.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

LIGHT RED (PINK)

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Red 1 Tbs (15 ml)
3. Pour color over the fabric. Press out some of the air bubbles, lift and press.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

YELLOW

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Yellow 8 Tbs (120 ml)
3. Pour color over the fabric. Press out some of the air bubbles, lift and press.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

LIGHT YELLOW

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Yellow 1 Tbs (15 ml)
3. Pour color over the fabric. Press out some of the air bubbles, lift and press.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

Store remaining dye concentrates in a cool place. Use it up before it gets too old. It will gradually lose its ability to bond with the fabric.

MIX TWO PRIMARY COLORS

Secondary and tertiary colors are made by mixing any two primaries in varying amounts. Secondary colors are green, orange, and violet. Tertiary colors are yellow-orange, red-orange, red-violet, blue-violet, blue-green, and yellow-green.

Any of the five variations described in the previous section (pages 27-31) will create the secondary colors, but each will have a different effect on the distribution of color on the fabric. Note that each of the colors in this section is made using a different Variation.

Have these ready before you start. There will be leftovers. Refer to page 24 for mixing dye concentrates and soda solution.

- Liquid dye concentrates:

Blue	1 cup (240 ml)
Gold	¼ cup (60 ml)
Red	½ cup (120 ml)
Yellow	½ cup (120 ml)

- ½ gallon (1.9 liters) warm soda solution
- 1 gallon (3.8 liters) warm water
- Containers:
  - Two 1- to 2-quart (1-2 liter) canisters
  - One flat plastic box
  - One 1- to 2-gallon (4-8 liter) canister
- Rubber bands
- Six 1 yard (1 meter) pieces of fabric

BLUE-GREEN #1

Based on BOUND AND UNBOUND

1. Dip 1 yd (1 m) of fabric in warm water, wring out and bind with 2 or 3 rubber bands and place in container.
2. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid:

   Blue 5 Tbs (75 ml)
3. Pour color over the fabric. Squeeze the fabric bundle a few times to get some of the dye to penetrate to the middle.
4. After 10-15 minutes, pour 1 cup (240 ml) warm soda solution over the bundle. Press to distribute soda ash through the fabric. Take off the rubber bands and rearrange the whole piece of fabric. Put the rubber bands on again or press the fabric tightly into the bottom of the container.
5. Wait 5-15 minutes.
6. Mix the following dye concentrate into 1 cup (240 ml) warm soda solution and pour immediately over fabric. Lift and press to distribute the soda ash and dye and to remove some of the air bubbles.

   Yellow 2 Tbs (30 ml)
7. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
8. Remove excess dye. See page 25.

BLUE GREEN #2

On another yard of fabric, follow the same recipe above, using gold instead of yellow in step five.

Gold 2 Tbs (30 ml)

RED TO ORANGE BLEND

Based on ONE LAYER, SEVERAL COLORS

1. Arrange 1 yd (1 m) of fabric into a flat container. Pour 1 cup (240 ml) plain warm water over the fabric, press to moisten, and rearrange wrinkles as you wish.
2. Make the following colors in separate cups using dye concentrates and plain warm water. Each color should make ½ to 1 cup (120-240 ml) liquid. Pour the red mix at one end and the yellow mix at the other end, allowing an inch or two of white fabric in between.

   Color A: **Red 4 Tbs (60 ml)**

   Color B: **Yellow 6 Tbs (90 ml)**
3. Mix and press out some of the air bubbles. As you press the fabric in the middle, you will see the colors blend. More movement of the fabric will make a more even color. The colors can be kept somewhat separate or blended completely, depending on what you do at this stage.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Press, stir, or turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

VIOLET TO BLUE GRADATION

Based on VALUE PARFAIT

1. Wet 1 yd (1 m) of fabric in plain warm water, squeeze out some excess, and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Blue **5 Tbs (75 ml)**

   Red **2 Tbs (30 ml)**
3. Pour color over the fabric. Mix and press out some of the air bubbles.
4. Pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Pour 1 cup (240 ml) warm soda solution over this layer. Mix or press to distribute the soda ash.
6. After 5-10 minutes, wet a third yard of fabric in plain warm water and arrange on top of the second layer. Pour 1 cup (240 ml) warm soda solution over this third layer. Mix or press to distribute the soda ash. Manipulate the fabric as you wish.
7. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time.
8. Remove excess dye. See page 25.

If you use Red MX 8B, you will find that your third value is very light and more blue than violet because most of the red has already fixed to the first two layers. If you want light violet fabric, use a different primary red, such as Red MX 5B, or try Variation #1 (page 27) with a small amount of dye.

Violet to Blue Gradation, Variation #4: Value Parfait, with about 10 minutes between layers. Inset shows fabric as it appears in the canister, but without dye so you can see the layers.

MIX THREE PRIMARY COLORS

Neutral colors, such as black and gray, are created by mixing all three primary colors. Also, subtle variations of the primary colors, sometimes referred to as grayed colors or toned down colors, like teal, burgundy, and brown, are created by mixing all three primaries. The following recipes are planned to give you some experience of the possibilities and to familiarize you with more of the variations described on pages 27-31.

Have these ready before you start. Refer to page 24 for mixing dye concentrate and soda solution. There will be leftovers.

- Liquid dye concentrates:

Blue	1 cup (240 ml)
Gold	½ cup (120 ml)
Red	½ cup (120 ml)
Yellow	½ cup (120 ml)

- ½ gallon (1.9 liters) warm soda solution
- 1 gallon (3.8 liters) warm water
- Containers:
  - Three 1- to 2-quart (1-2 liter) canisters
  - One 1- to 2-gallon (4-8 liter) canister
  - One flat plastic box
- Six 1 yard (1 meter) pieces of fabric

Red to Orange Blend, Variation #3: One Layer, Several Colors. Light red areas occurred where fabric was exposed to the air part of the dyeing time. (Recipe page 43)

GRAY-PINK

Based on ONE LAYER, ONE COLOR

When you mix equal parts of blue, red, and yellow, you might expect to get black, or if the color is very diluted, gray. You will see in this recipe, however, that with these dyes, neutral colors are not made of equal portions of each primary color.

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Blue **¼ tsp (1 ml)**
   Red **¼ tsp (1 ml)**
   Yellow **¼ tsp (1 ml)**
3. Pour color over the fabric. Press out some of the air bubbles, lift and press. More movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash. More movement of the fabric will make a more even color.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of fabric will make a more even color.
6. Remove excess dye. See page 25.

The color of the fabric will be greatly influenced by how much you move the fabric. If you stir it a lot, you will get a dull gray-pink color spread all over the fabric. If you move the fabric the absolute minimum, you will see the colors more separated along the folds of the fabric: greens, browns and pinks.

DARK BROWN

Based on ONE LAYER, ONE COLOR

To get a color closer to black or brown, use more blue and gold or yellow than red.

Remember: the kind of fabric will influence the color value, particularly the density of the weave and whether or not it has been mercerized.

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Blue **4 Tbs (60 ml)**
   Gold **4 Tbs (60 ml)**
   Red **1 Tbs (15 ml)**
3. Pour color over the fabric. Press out some of the air bubbles, lift and press. More movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Lift and press to distribute the soda ash through the fabric. More movement of the fabric will make a more even color.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
6. Remove excess dye. See page 25.

ORANGE/GREEN MIX

Based on BOUND AND UNBOUND

Most of the colors we see and use are more complex than pure primary and secondary colors. They have all three primary colors in them.

1. Dip 1 yd (1 m) of fabric in plain warm water, wring out and bind with 2 or 3 rubber bands and place in container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Red 1 tsp (5 ml)
   Yellow 3 Tbs (45 ml)
3. Pour color over the fabric. Squeeze the fabric bundle a few times to get some of the dye to penetrate to the middle.
4. After 10-15 minutes, pour 1 cup (240 ml) warm soda solution over the bundle. Press to distribute soda ash through the fabric. Take off the rubber bands and rearrange the whole piece of fabric. Put the rubber bands on again or press the fabric tightly into the bottom of the container.
5. Wait 5-15 minutes.
6. Mix the following dye concentrate into 1 cup (240 ml) warm soda solution and pour immediately over fabric. Lift and press to distribute the soda ash and dye and to remove some of the air bubbles.

   Blue 2 Tbs (30 ml)
7. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
8. Remove excess dye. See page 25.

The time to wait before adding soda in Step 4 is longer than the other variations in order to allow the first color to fix longer. Then the second color will make a second pattern with the new folds.

GRAYED COLORS

Based on COLOR PARFAIT

1. Wet 1 yd (1 m) of fabric in warm water, squeeze out some excess, and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Layer one: **Blue 4 tsp (20 ml)**
   Red ½ tsp (2-3 ml)
3. Pour color over fabric. Mix and press out some of the air bubbles. Manipulate the fabric as you wish; more movement of the fabric will make a more even color.
4. Pour 1 cup (240 ml) warm soda solution over fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid and pour over the second layer of fabric.

   Layer two: **Red ½ tsp (2-3 ml)**
   Yellow 2 tsp (10 ml)
6. Manipulate the fabric as you wish, but keep the fabric in layers. Pour 1 cup (240 ml) warm soda solution over the second layer. Lift this layer slightly and press to distribute the soda ash.
7. Let the dye work for one hour minimum after the second layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time. Again, more movement of fabric will make a more even color.
8. Remove excess dye. See page 25.

RED-BROWN

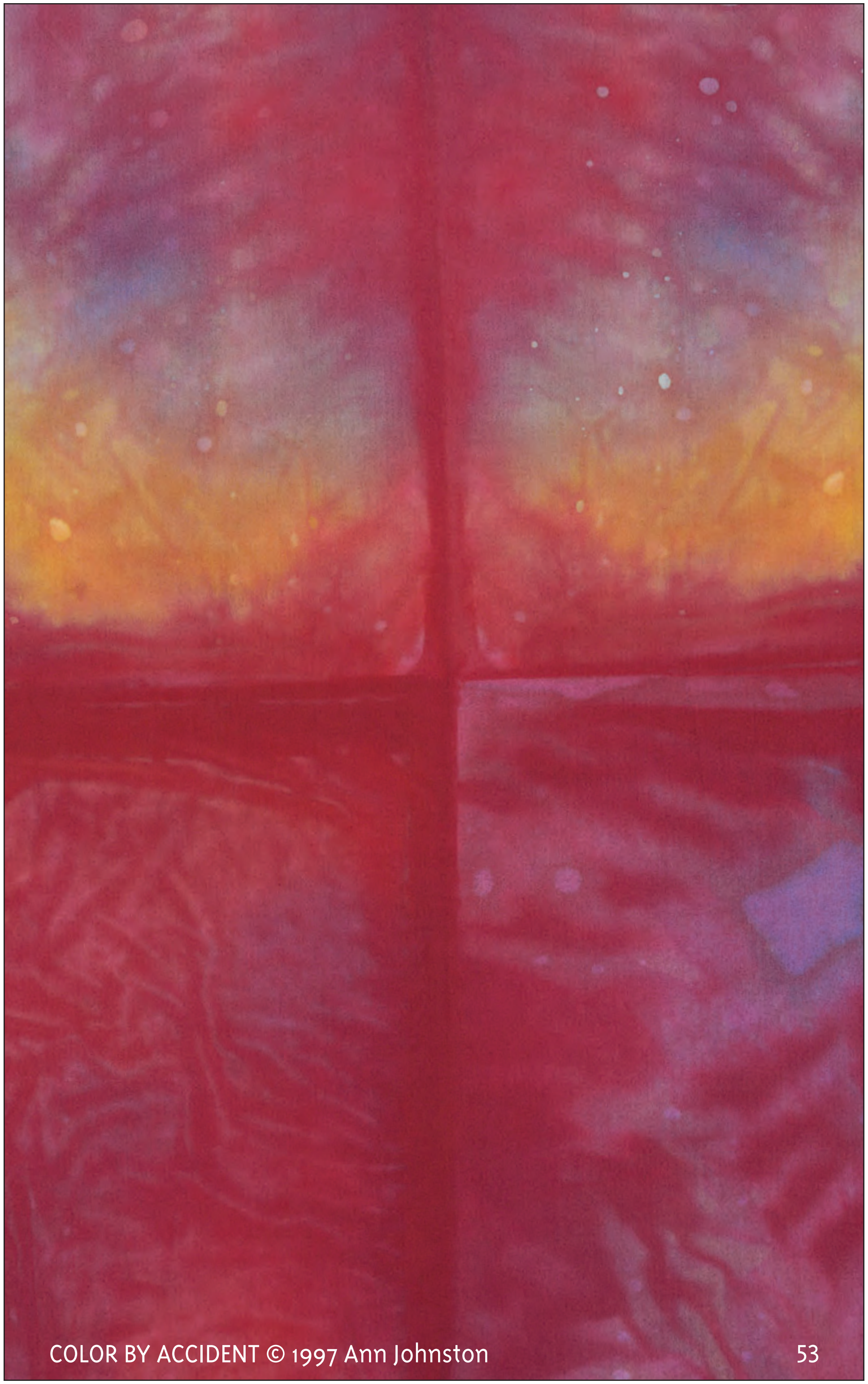
Based on ONE LAYER, SEVERAL COLORS

1. Fold 1 yd (1 m) of fabric just enough times (1-4) to fit into the bottom of a large, flat container. Pour 1 cup (240 ml) plain warm water over the fabric, press to moisten, and arrange as you wish.
2. Mix the following grouped colors in three separate cups using dye concentrates and plain warm water. Each color should make 1/2 to 1 cup (120-240 ml) liquid. Pour the colors on different parts of the fabric: over, under, and/or between the layers.

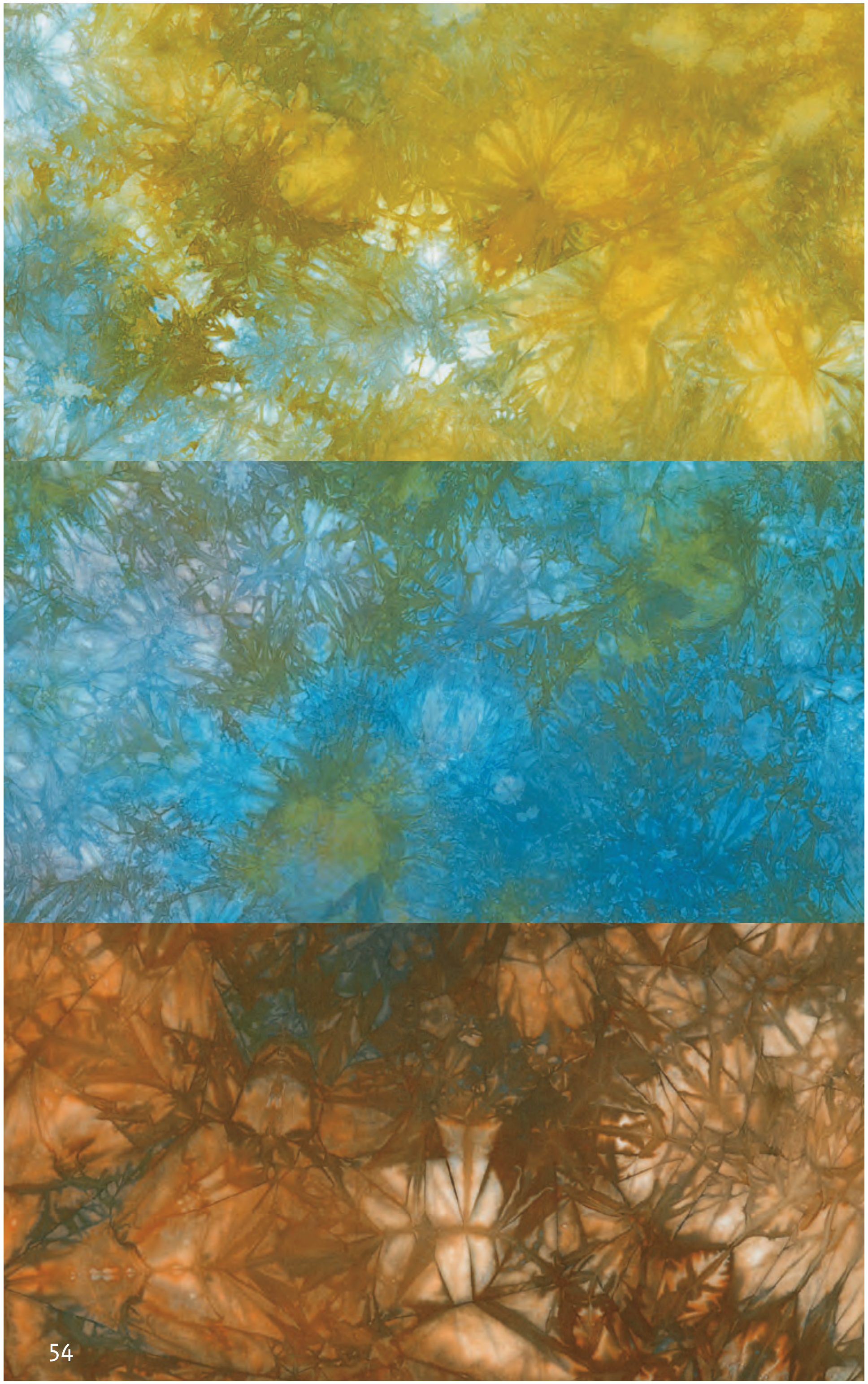
Color A:	**Blue**	**3 Tbs (45 ml)**
	Red	**1 tsp (5 ml)**
Color B:	**Red**	**2 Tbs (30 ml)**
	Yellow	**2 Tbs (30 ml)**
Color C:	**Gold**	**2 Tbs (30 ml)**

3. Mix and press out some of the air bubbles. More movement of the fabric will make a more even color. The colors can be kept somewhat separate or blended completely, depending on what you do at this stage.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Press, stir, or turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
6. Remove excess dye. See page 25.

Option: try using soda water in Step 1 instead of plain water.



Red-Brown, Variation #3: One Layer, Several Colors, folded with very little mixing.



Orange/Blue/Gold Layers, Variation #5: Color Parfait, tightly wrinkled with very little mixing. Orange poured on the bottom layer, blue poured on the middle layer, gold poured on the top layer. Samples shown in layer order. *(Recipe page 57)*

DYEING FOUR SEASONS

These fabric dyeing recipes are organized around my idea of the colors of fabric I might want to use to illustrate the four seasons. They are designed for a range of color and value and technique within each seasonal grouping. You will be trying some *variations* on the variations described on pages 27-31. The following recipes will vary in some details from what you have already done, so read them before you measure and pour dye. Some of the characteristics of the dye colors themselves will become apparent, especially if you try the same recipe, for example, using two different reds.

Use these recipes as base colors to help plan future dye sessions. If you come up with a color you never use, realize that you may not have used it only because it is not sold in the fabric stores. New colors may change your work. Of course, you always have the option of overdyeing it at a later date!

Each season uses nine yards (9 m) of fabric, a total of thirty-six yards (36 m) altogether. For smaller or larger amounts multiply or divide accordingly. See Table C on page 26.

FALL COLORS

These fall colors are based on gold and orange with accents of rust, violet and olive green. You will use Variations #1, #3, and #5. In the Cool Black and Gray recipe (page 62), you can try different effects with spring clamps.

Have these ready before you start. Refer to page 24 for mixing dye concentrates and soda solution. There will be leftovers.

- Liquid dye concentrates:

Black	½ cup (120 ml)
Blue	1 cup (240 ml)
Gold	1 cup (240 ml)
Orange	½ cup (120 ml)
Red	½ cup (120 ml)

- 1 gallon (3.8 liters) warm soda ash solution
- 1½ gallons (5.7 liters) warm water
- Containers:
  Two 1- to 2-gallon (4-8 liter) canisters
  Three flat plastic boxes
- Heavy-duty spring clamps
- Optional: plastic shapes for clamps
- Nine 1 yard (1 meter) pieces of fabric

ORANGE/BLUE/GOLD LAYERS

Based on COLOR PARFAIT

Follow this recipe keeping each piece of fabric in a separate layer and keep the mixing to a minimum. The results will be three pieces of distinctly colored fabric.

1. Wet 1 yd (1 m) of fabric in warm water, squeeze out some excess, and arrange in a deep container.
2. Mix the following dye concentrate with warm water to make 1 cup (240 ml) liquid:
   Layer one: **Orange 5 Tbs (75 ml)**
3. Pour color over fabric. Mix and press out some of the air bubbles.
4. Pour 1 cup (240 ml) warm soda solution over fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid and pour over the second layer of fabric:
   Layer two: **Blue 3 Tbs (45 ml)**
6. Pour 1 cup (240 ml) warm soda solution over this layer. Lift this layer slightly and press to distribute the soda ash.
7. After 5-10 minutes, moisten a third yard of fabric in plain warm water and arrange on top of the second layer. Mix the following dye concentrate with plain warm water to make 1 cup (240 ml) liquid and pour over the third layer of fabric.
   Layer three: **Gold 5 Tbs (75 ml)**
8. Pour 1 cup (240 ml) warm soda solution over this layer. Lift this layer slightly and press to distribute the soda ash.
9. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press the top layer of fabric once during this time.
10. Remove excess dye. See page 25.

GOLD TO RUST BLEND

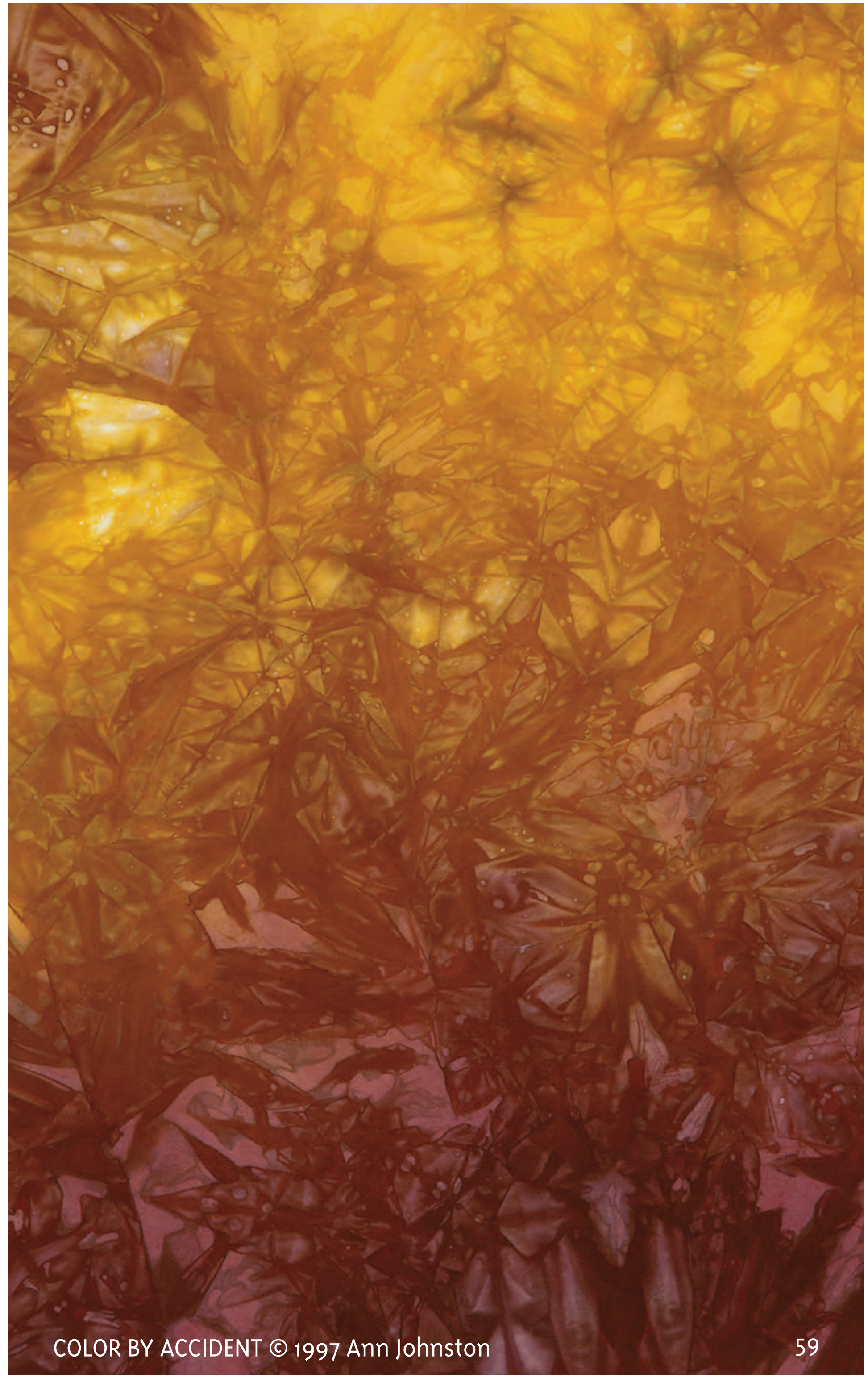
Based on ONE LAYER, SEVERAL COLORS

1. Arrange 1 yd (1 m) of fabric in a flat container. Pour 1 cup (240 ml) plain warm water over the fabric, press to moisten, and rearrange wrinkles as you wish.
2. Make the following colors in separate cups using dye concentrates and plain warm water. Each color should make ½ to 1 cup (120-240 ml) liquid. Pour the colors over different parts of the fabric.

Color A:	**Gold**	**3 Tbs (45 ml)**
Color B:	**Orange**	**2 Tbs (30 ml)**
	Blue	**1 tsp (5 ml)**
	Red	**½ tsp (2-3 ml)**

3. Mix and press out some of the air bubbles. More movement of the fabric will make a more even color. The colors can be kept somewhat separate or blended completely, depending on what you do at this stage.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Press, stir, or turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
6. Remove excess dye. See page 25.

Look at where you pour the colors on the fabric. Do you want the color to change from selvage to selvage or from end to end? The size of the basin you use depends on the amount of fabric you will dye and the markings you want. The looser the fabric is in the container, the fewer fold marks will result.



Gold to Rust Blend, Variation #3: One Layer, Several Colors, very little stirring.

GOLD/MAGENTA/PURPLE LAYERS

Based on COLOR PARFAIT

1. Wet 1 yd (1 m) of fabric in plain warm water, and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Layer one: **Blue 1/4 tsp (1 ml)**
   Gold 4 Tbs (60 ml)
   Red 1/8 tsp (0.5 ml)

3. Pour color over fabric. Press lightly.
4. Pour 1 cup (240 ml) warm soda solution over fabric. Press to distribute the soda.
5. After 5-10 minutes, wet a second yard of fabric in warm water and arrange on top of first layer. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid and pour over the second layer of fabric.

   Layer two: **Blue 1 Tbs (15 ml)**
   Red 3 Tbs (45 ml)

6. Pour 1 cup (240 ml) warm soda solution over this layer. Press to distribute the soda ash.
7. After 5-10 minutes, wet a third yard of fabric in warm water and arrange on top. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid and pour over the third layer. Mix slightly.

   Layer three: **Blue 3 Tbs (45 ml)**
   Red 1 Tbs (15 ml)

8. Pour 1 cup (240 ml) warm soda solution over this layer. Press to distribute the soda ash.
9. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press the top layer of fabric once during this time.
10. Remove excess dye. See page 25.

Do a minimum of mixing and keep the fabric in layers if you want lots of markings and three distinctly colored fabrics.

Gold/Magenta/Purple Layers, Variation #5: Color Parfait, tightly wrinkled, with very little mixing. Gold poured on the bottom layer, magenta poured on the middle layer, purple poured on the top layer. Inset shows the fabric in the canister, but without dye so you can see the fabric.

COOL BLACK AND GRAY

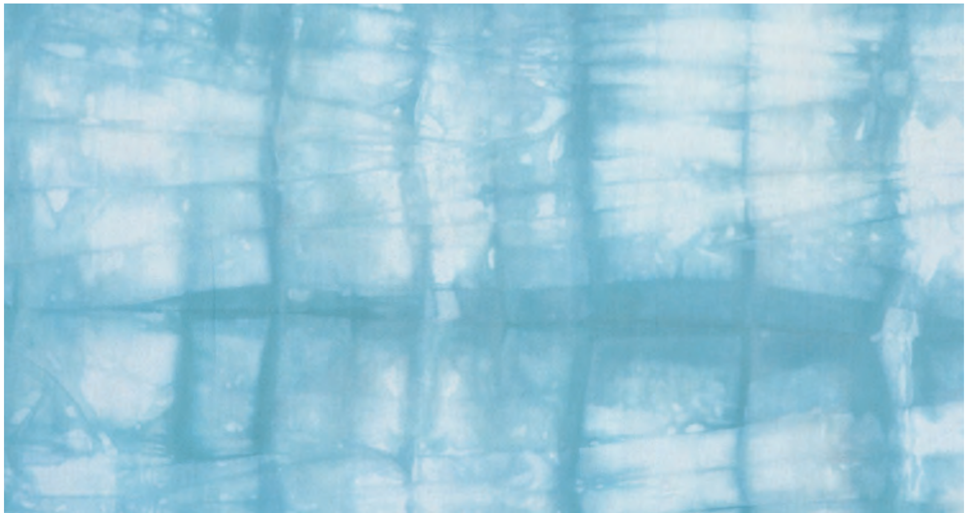
Based on ONE LAYER, ONE COLOR

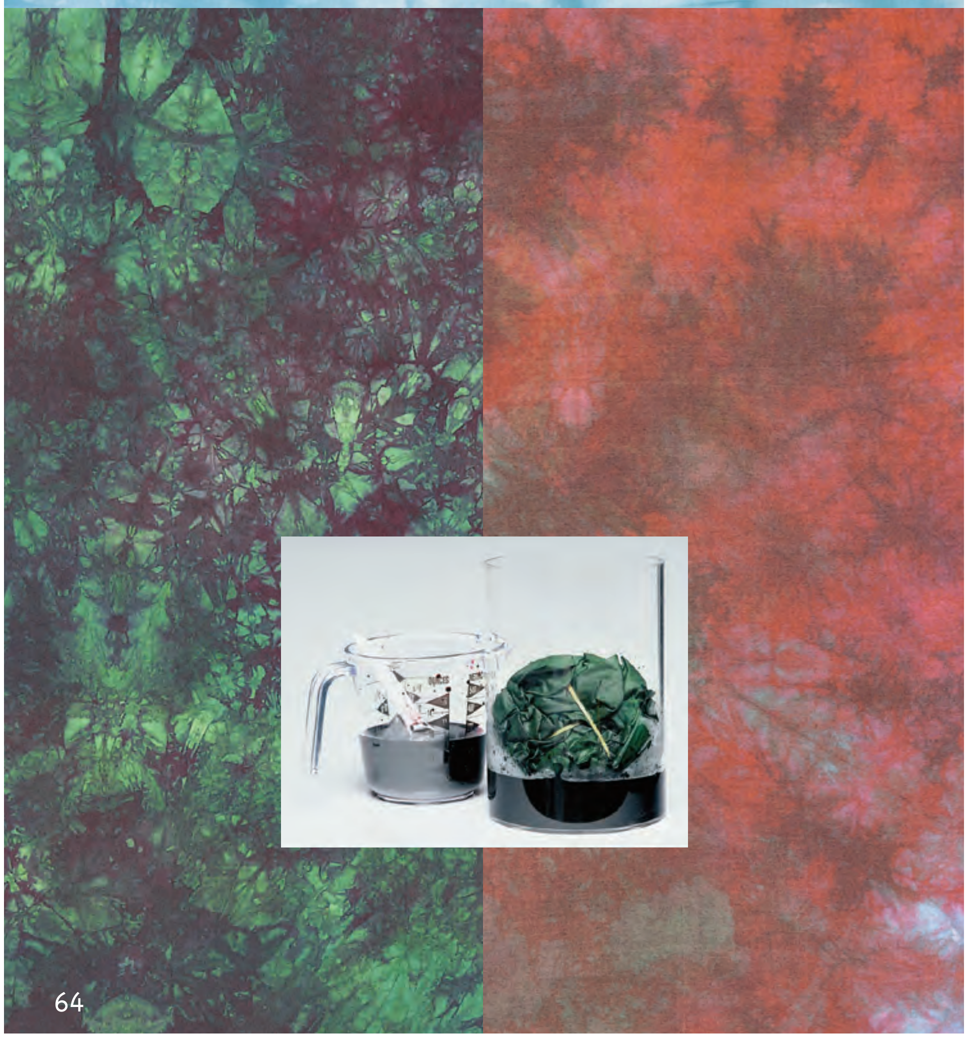
Use clamps to create a pattern on the fabric before the dye is applied. The clamps will create a resist where the dye cannot penetrate, leaving areas of white.

1. Fold 1 yd (1 m) of fabric, pinch with heavy duty spring clamps, and place in a container. Arrange a second yard of fabric in a different pattern of folds, clamp, and place in another container. Wet each yard of fabric with 1 cup (240 ml) warm water.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 1/8 cup (270 ml) liquid:
   - **Black 6 Tbs (90 ml)**
   - **Blue 4 Tbs (60 ml)**
   - **Gold 4 Tbs (60 ml)**
3. Pour 1 cup (240 ml) of the above over one yard of the fabric, add enough plain warm water to the remaining dye to make 1 cup (240 ml), and pour it over the second yard of fabric.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over each piece of fabric. Lift and press to distribute the soda ash.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time.
6. Remove excess dye. See page 25.

Plastic shapes like circles or triangles can be clamped onto the fabric to create a more distinct design. This is a good technique for overdyeing another color.

Cool Black and Gray, Variation #1: One Layer, One Color. The samples show the results with and without round plastic pieces inserted under the clamps. Inset shows fabric clamped with plastic pieces in black dye, plain clamps in gray dye.





WINTER COLORS

These winter colors range from deep Christmas red and green to light icy blue. Another way to make a gradation is described in the warm black to gray recipe on page 69. You will use Variations #1, #2, and #5 and experiment with patterns created by folds ironed in before the fabric is dyed.

Have these ready before you start. Refer to page 24 for mixing dye concentrates and soda solution. There will be leftovers.

- Liquid dye concentrates:

Black	1 cup (240 ml)
Blue	½ cup (120 ml)
Red	1½ cup (360 ml)
Turquoise	¼ cup (60 ml)
Yellow	1 cup (240 ml)

- 1 gallon (3.8 liters) warm soda ash solution
- 1½ gallons (5.7 liters) warm water
- Containers:
  - Five 1- to 2-quart (1-2 liters) canisters
  - One 1- to 2-gallon (4-8 liter) canister
  - One flat plastic box
- Iron and ironing board
- Nine 1 yard (1 meter) pieces of fabric

TOP: Ice Blue, Variation #1: One Layer, One Color, ironed folds, no mixing. (Recipe page 67)

BOTTOM: Dark Green/Red Mix, Variation #2: Bound and Unbound. Two pieces of fabric show the same recipe applied to cotton, left, and silk, right. Inset shows the fabric in the container before the red is applied. (Recipe page 68)

SCARLET/BURGUNDY/MAGENTA LAYERS

Based on COLOR PARFAIT

1. Wet 1 yd (1 m) of fabric in plain warm water and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Layer one: **Red** **6 Tbs (90 ml)**
   Yellow **3 Tbs (45 ml)**
3. Pour color over fabric. Press lightly.
4. Pour 1 cup (240 ml) warm soda solution over fabric. Press to distribute the soda ash.
5. After 5-10 minutes, wet a second yard of fabric and arrange on top of first layer. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid and pour over the second layer of fabric. Mix slightly.

   Layer two: **Blue** **1 tsp (5 ml)**
   Red **6 Tbs (90 ml)**
   Yellow **2 Tbs (30 ml)**
6. Pour 1 cup (240 ml) warm soda solution over this layer. Press to distribute the soda ash.
7. After 5-10 minutes, wet a third yard of fabric and arrange on top of the second layer. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid and pour over the third layer of fabric. Mix slightly.

   Layer three: **Blue** **1 Tbs (15 ml)**
   Red **6 Tbs (90 ml)**
8. Pour 1 cup (240 ml) warm soda solution over this layer. Press to distribute the soda.
9. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press the top layer of fabric once during this time.
10. Remove excess dye. See page 25.

The more time you allow between layers, the more dye will fix on the fabric already in the container, making each layer a more distinct color. A lot of mixing will counteract this effect somewhat.

ICE BLUE

Based on ONE LAYER, ONE COLOR

1. Fold or pleat 1 yd (1 m) of fabric and press with steam iron. Fold across the pleats and firmly iron again. Place flat in the bottom of a container and wet with 1 cup (240 ml) plain warm water.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Turquoise **1/4 tsp (1 ml)**
   Black **1/8 tsp (0.5 ml)**
3. Tip the container and pour the above mixture into the water in the bottom of the container, **not** onto the fabric. Then level the container and allow the color to flow through the fabric. Allow dye to sit in folds. Do not manipulate the fabric at all.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Shake the container slightly to distribute the soda ash without disturbing the pleats and folds in the fabric.
5. Let the dye work for one hour minimum. Do not turn or stir the fabric.
6. Remove excess dye. See page 25.

The way you fold and move the fabric is up to you. Different patterns will be created according to how you wrinkle it.

DARK GREEN/RED MIX

Based on BOUND AND UNBOUND

1. Dip 1 yd (1 m) of fabric in plain warm water, wring out and bind with 2 or 3 rubber bands, and place in container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Blue 5 Tbs (75 ml)
   Yellow 3 Tbs (45 ml)
3. Pour color over the fabric. Squeeze the fabric bundle a few times to get some of the dye to penetrate to the middle.
4. After 10-15 minutes, pour 1 cup (240 ml) warm soda solution over the bundle. Press to distribute soda ash through the fabric. Take off the rubber bands and rearrange the whole piece of fabric. Put the rubber bands on again or press the fabric tightly into the bottom of the container.
5. Wait 5-15 minutes.
6. Mix the following dye concentrates into 1 cup (240 ml) warm soda solution and pour immediately over fabric. Lift and press to distribute the soda ash and dye and to remove some of the air bubbles.

   Blue 1 Tbs (15 ml)
   Red 2 Tbs (30 ml)
   Yellow 1 Tbs (15 ml)
7. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
8. Remove excess dye. See page 25.

WARM BLACK TO GRAY GRADATION

Based on ONE LAYER, ONE COLOR

This recipe creates a value gradation by gradually diluting the original color mixture so each mixture is lighter than the one before. Putting each piece in a separate container makes the final colors more likely to be closely related than if they are put in the same container at different times.

The different colors mixed to make black each fix at a different rate. If you made a Value Parfait in four layers of just black, the last piece of fabric would be predominately the slowest color to fix. Try it to compare results with this recipe.

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Do the same with three more yards of fabric in three separate containers.
3. Mix together the following dye concentrates with enough plain warm water to make a total of 2 cups (480 ml) liquid:

   Black 14 Tbs (210 ml)
   Red 2 Tbs (30 ml)
4. Pour 1¼ cups (300 ml) of the above color over the first yard of fabric in the first container.
5. Add plain warm water to the remaining color to make 2 cups (480 ml). Pour 1 cup (240 ml) over fabric in second container.
6. Add plain warm water to the remaining color to make 2 cups (480 ml). Pour 1 cup (240 ml) over fabric in third container.
7. Add plain warm water to the remaining color to make 2 cups (480 ml). Pour 1 cup (240 ml) over fabric in fourth container.
8. Press out some of the air bubbles in each container. Mix and rearrange wrinkles as you wish.
9. After 10-15 minutes, pour 1 cup (240 ml) warm soda solution in each container. Mix to distribute the soda ash.
10. Let the dye work for one hour minimum in each container after the soda is added. Turn the fabric once or more often during this time. Again, more movement of fabric will make a more even color.
11. Remove excess dye. See page 25.

SPRING COLORS

These spring colors range from clear yellow-green and turquoise to dark teal. You will use Variations #1, #3, and #4 and at the same time you will experiment with creating patterns with plastic clothes pins and rubber bands.

Have these ready before you start. Refer to page 24 for mixing dye concentrates and soda solution. There will be leftovers.

- Liquid dye concentrates:

Blue	½ cup (120 ml)
Gold	¼ cup (60 ml)
Orange	¼ cup (60 ml)
Red	¼ cup (60 ml)
Turquoise	1 cup (240 ml)
Yellow	1 cup (240 ml)

- 1 gallon (3.8 liters) warm soda ash solution
- 1½ gallons (5.7 liters) warm water
- Containers:
  - Two 1- to 2-quart (1-2 liter) canisters
  - One 1- to 2-gallon (4-8 liter) canister
  - Two flat plastic boxes
- Plastic clothes pins
- Rubber bands
- Nine 1 yard (1 meter) pieces of fabric

YELLOW-GREEN GRADATION

Based on VALUE PARFAIT

1. Wet 1 yd (1 m) of fabric in warm water, squeeze out some excess, and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

Blue	**1 Tbs (15 ml)**
Yellow	**6 Tbs (90 ml)**

3. Pour color over the fabric. Press out some of the air bubbles. Manipulate the fabric as you wish; more movement of the fabric will make a more even color.
4. Pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Pour 1 cup (240 ml) warm soda solution over the second layer. Mix or press to distribute the soda ash. Manipulate the fabric as you wish; more movement of the fabric will make a more even color.
6. After 5-10 minutes, wet a third yard of fabric in plain warm water and arrange on top of the second layer. Pour 1 cup (240 ml) warm soda solution over the third layer. Mix or press to distribute the soda ash. Manipulate the fabric as you wish.
7. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time.
8. Remove excess dye. See page 25.

RED-VIOLET TO TURQUOISE BLEND

Based on ONE LAYER, SEVERAL COLORS

1. Fold 1 yd (1 m) of dry fabric and arrange in a large, flat container. Pour 1 cup (240 ml) plain warm water over the fabric, press to moisten, and rearrange wrinkles as you wish. Wet a second yard of fabric in plain warm water, squeeze out some excess water, bind with rubber bands, and place in same container, next to the first piece of fabric.
2. Make the following colors in separate cups using dye concentrates and plain warm water. Each color should make 1 cup (240 ml) liquid. Pour the colors over different ends of the fabric.

   Color A: **Red** **2 Tbs (30 ml)**

   Color B: **Turquoise** **6 Tbs (90 ml)**

3. Press and turn first piece of fabric; do not move the second piece of fabric at all. The colors can be kept somewhat separate or blended completely, depending on what you do at this stage.
4. After 5-15 minutes, pour 2 cups (480 ml) warm soda solution over all the fabric. Press slightly to distribute the soda ash.
5. Let the dye work for one hour minimum. Press, stir, or turn the first piece of fabric once or more often during this time. Leave the second piece of fabric undisturbed.
6. Remove excess dye. See page 25.

Use the same color gradation for two pieces of fabric, but create different patterns by manipulating each piece of fabric differently.

Red-Violet to Turquoise Blend, Variation #3: One Layer, Several Colors. The piece bound with rubber bands, top, shows much more white and sharper lines. The fabric folded and arranged dry, bottom, has fewer, softer shapes. Inset shows both pieces in the same container.

COOL YELLOWS

Based on ONE LAYER, SEVERAL COLORS

1. For 1 yd (1 m) fabric, make accordion folds 2-3 inches wide across the width of the fabric and then fold lengthwise to fit in a narrow, flat container. Do the same process to a second yard (meter) of fabric, but use 6-10 clothespins along one edge to hold the folds tightly in place. Place both pieces of fabric together, upright on the folded edges, not flat in the bottom. Pour 2 cups (480 ml) plain warm water over the fabric.
2. Mix the following colors in separate cups using dye concentrates and plain warm water to make 1 cup (240 ml) liquid each. Pour Color A over the fabric; press to mix. Pour Color B into the liquid in the bottom of the container with a minimum of mixing.

Color A:	**Red**	**¼ tsp (1 ml)**
	Yellow	**6 Tbs (90 ml)**
Color B:	**Blue**	**½ tsp (2-3 ml)**

3. Allow the colors to fix where they touch the fabric without mixing.
4. After 5-15 minutes, pour 2 cups (480 ml) warm soda solution over the fabric. Press slightly to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. If you do not stir or turn the fabric during this time, you will have more color variations.
6. Remove excess dye. See page 25.

Cool Yellows, Variation #3: One Layer, Several Colors. Samples shown were pleated with clothespins, left, and without, right. Two outcomes of the same recipe: top two samples were done one day, bottom two on another. Green shows more on the top samples because the fabric was not agitated after the blue was added. Inset shows the fabric in the dye after the blue is added.

TWO TEALS

Based on ONE LAYER, ONE COLOR

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container. Do the same in another container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid for each color:

Color A:	**Red**	**½ tsp (2-3 ml)**
	Turquoise	**5 Tbs (75 ml)**
	Yellow	**1 tsp (5 ml)**
Color B:	**Blue**	**5 Tbs (75 ml)**
	Gold	**1 tsp (5 ml)**
	Orange	**1 tsp (5 ml)**

3. Pour Color A over the fabric in the first container and Color B over the fabric in the second container. Press out some of the air bubbles. More movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 2 cups (480 ml) warm soda solution over the fabric, 1 cup (240 ml) in each container. Lift and press to distribute the soda ash through the fabric. More movement of the fabric will make a more even color.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of fabric will make a more even color.
6. Remove excess dye. See page 25.

SUMMER COLORS

These recipes will give you a range of colors from light pastels and tans to the intense golds and reds of summer. You will use Variations #1, #2, and #4 and at the same time discover how little dye it takes to make light values and how much dye it takes to make intense colors.

Have these ready before you start. Refer to page 24 for mixing dye concentrate and soda solution. There will be leftovers.

- Liquid dye concentrates:

Blue	¼ cup (60 ml)
Gold	½ cup (120 ml)
Orange	¼ cup (60 ml)
Red	½ cup (120 ml)
Yellow	½ cup (120 ml)

- 1 gallon (3.8 liters) warm soda ash solution
- 1½ gallons (5.7 liters) warm water
- Containers:
  - Five 1- to 2-quart (1-2 liter) canisters
  - Two 1- to 2-gallon (4-8 liter) canisters
- Rubber bands
- Nine 1 yard (1 meter) pieces of fabric

THREE TANS

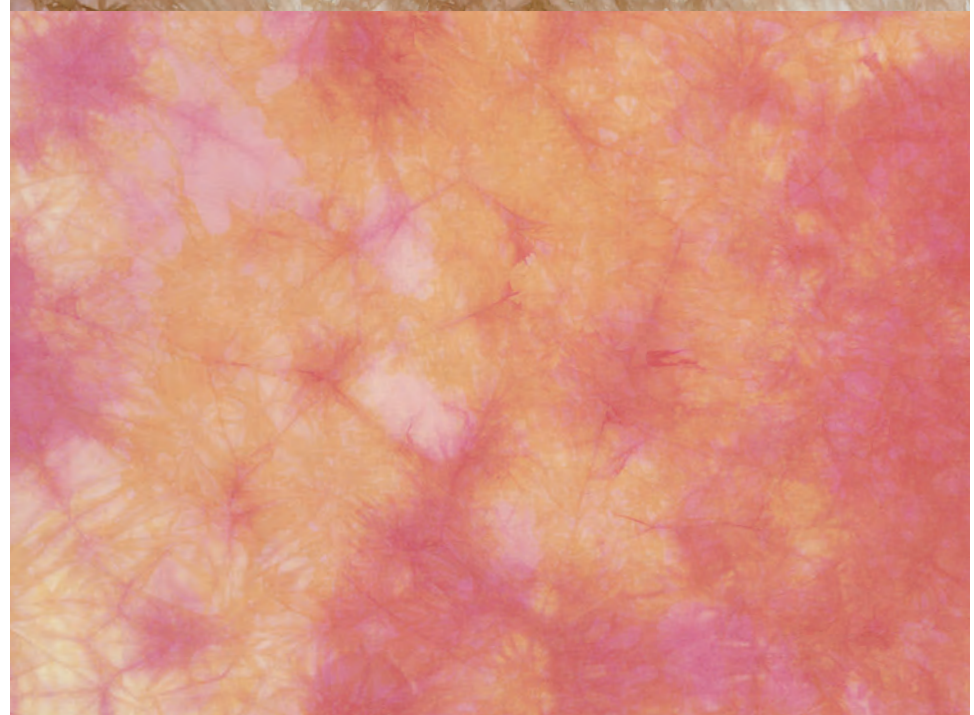
Based on ONE LAYER, ONE COLOR

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container. Do the same in two more containers.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid for each color:

Color A:	**Blue**	**2 drops**
	Gold	**1/4 tsp (1 ml)**
	Red	**2 drops**
Color B:	**Blue**	**1/2 tsp (2-3 ml)**
	Gold	**2 tsp (10 ml)**
	Red	**1/4 tsp (1 ml)**
Color C:	**Blue**	**1/8 tsp (0.5 ml)**
	Gold	**1/4 tsp (1 ml)**
	Red	**2 drops**

3. Pour Color A over the fabric in the first container, Color B over the fabric in the second container, and Color C over the fabric in the third container. Press out some of the air bubbles, lift and press. More movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric in each container, 3 cups (720 ml) altogether. Lift and press to distribute the soda ash through the fabric. More movement of the fabric will make a more even color.
5. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of fabric will make a more even color.
6. Remove excess dye. See page 25.

Some dyes blend more easily. Try Blue MX-2G Gold MX-3RA Red MX-5B for light neutrals.



TOP: Tan, Variation #1: One Layer, One Color. Shown is Color B, the darkest tan from the Three Tans recipe. The fabric was stirred several times during the process to blend the colors.

BOTTOM: Sunrise Pink, Variation #2: Bound and Unbound, tightly bound when the fabric is wet, to make fine lines. (Recipe page 81)

Warm Red Gradation, Variation #4: Value Parfait. Shown at the top is the top layer; below is the bottom layer, always darker than the top in a Value Parfait and more evenly colored in this example because it was mixed more. (Recipe page 84)

SUNRISE PINK

Based on BOUND AND UNBOUND

1. Dip 1 yd (1 m) of fabric in plain warm water, wring out and bind with 2 or 3 rubber bands, and place in container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

Blue	**1 drop**
Red	**1/4 tsp (1 ml)**
Yellow	**1/4 tsp (1 ml)**

3. Pour color over the fabric. Squeeze the fabric bundle a few times to get some of the dye to penetrate to the middle.
4. After 10-15 minutes, pour 1 cup (240 ml) warm soda solution over the bundle. Press to distribute soda ash through the fabric. Take off the rubber bands and rearrange the whole piece of fabric. Put the rubber bands on again or press the fabric tightly into the bottom of the container.
5. Wait 5-15 minutes.
6. Mix the following dye concentrates into 1 cup (240 ml) warm soda solution and pour immediately over fabric. Press to distribute the soda ash and dye and to remove some of the air bubbles.

Blue	**1/8 tsp (0.5 ml)**
Red	**1 drop**
Yellow	**1/8 tsp (0.5 ml)**

7. Let the dye work for one hour minimum. Turn the fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
8. Remove excess dye. See page 25.

SKY BLUE

Based on ONE LAYER, ONE COLOR

1. Wet 1 yd (1 m) of fabric with 1 cup (240 ml) plain warm water. Press the fabric into the bottom of a container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 2 cups (480 ml) liquid:

   Blue **1/8 tsp (0.5 ml)**
   Red **1 drop**
3. Pour 1/2 cup (120 ml) of the above color mixture over the fabric. Mix, turn, look at value, and add up to 1/2 cup (120 ml) more if you want it darker. Press out some of the air bubbles. More movement of the fabric will make a more even color.
4. After 5-15 minutes, pour 1 cup (240 ml) warm soda solution over the fabric. Add more of the blue mixture at this time if you wish to make a darker color. Lift and press to distribute the soda ash through the fabric.
5. Let the dye work for one hour minimum. Leave the fabric completely undisturbed during this time to get more variety of value on the fabric. Press or turn once or more often for more even color distribution.
6. Remove excess dye. See page 25.

You will use more water in this recipe to dilute the dye concentrate. You may use part or all of this mixture depending on how pale you want your sky blue.

Remember that wet fabric appears darker than the final, dry fabric will look.

ORANGE TO YELLOW GRADATION

Based on VALUE PARFAIT

1. Wet 1 yd (1 m) of fabric in plain warm water, squeeze out some excess, and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

   Gold **1 Tbs (15 ml)**
   Red **1/4 tsp (1 ml)**
   Yellow **2 Tbs (30 ml)**
3. Pour color over the fabric. Mix and press out some of the air bubbles. Manipulate the fabric as you wish; more movement of the fabric will make a more even color.
4. Pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Pour 1 cup (240 ml) warm soda solution over the second layer. Mix or press to distribute the soda ash. Manipulate the fabric as you wish.
6. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time.
7. Remove excess dye. See page 25.

WHERE DID THE RED GO? If you used Red MX-8B, you will notice that the first layer of yellow is very orange and the top layer of yellow is not. Most of the red dye reacted with the first layer of fabric and the water before the second layer was added.

The results are different if you use Red MX-5B, because it doesn't react as quickly as Red MX-8B.

WARM RED GRADATION

Based on VALUE PARFAIT

1. Wet 1 yd (1 m) of fabric in plain warm water, squeeze out some excess, and arrange in a deep container.
2. Mix together the following dye concentrates with enough plain warm water to make a total of 1 cup (240 ml) liquid:

Blue	**½ tsp (2-3 ml)**
Gold	**1 Tbs (15 ml)**
Orange	**3 Tbs (45 ml)**
Red	**4 Tbs (60 ml)**
Yellow	**2 Tbs (30 ml)**

3. Pour color over the fabric. Mix and press out some of the air bubbles. Manipulate the fabric as you wish; more movement of the fabric will make a more even color.
4. Pour 1 cup (240 ml) warm soda solution over the fabric. Mix or press to distribute the soda ash through the fabric.
5. After 5-10 minutes, wet a second yard of fabric in plain warm water and arrange on top of first layer. Pour 1 cup (240 ml) warm soda solution over the second layer. Mix or press to distribute the soda ash. Manipulate the fabric as you wish.
6. Let the dye work for one hour minimum after the last layer of fabric and soda solution is added. Press or turn the top layer of fabric once or more often during this time. Again, more movement of the fabric will make a more even color.
7. Remove excess dye. See page 25.

ANY QUESTIONS?

Can I work in a cold room?
Procion® MX dyes require room temperature or higher, 70-110°F (21-43°C), to work best. Warm water temperatures, 70-90°F (21-32°C), are important to achieve dark colors, so you may want to make adjustments for a cold day in a variety of ways. If you mix a new warm soda solution before you work each time and keep your plain water warm, you can probably keep the dye bath warm enough. Another possibility is to cover the containers with black plastic and take them to a sunny spot while the dye is fixing.

How long can I use my liquid dye concentrates?
If you have old dye concentrates, DYE A PIECE OF FABRIC a dark color to test them and see how much color loss has occurred. It is impossible to predict the dye's strength by counting how many days have passed. In cool conditions they last much longer. The basic rule of thumb is 4 to 7 days at room temperature. DON'T THROW THEM AWAY, just use them on T-shirts or something where color value isn't critical. Store cool. For safety purposes do not store with food.

Why do I have so much white?
The light areas on your fabric are places the dye couldn't penetrate. If you want less white, bind it more loosely or not at all, and stir more. Be sure to squeeze any bound pieces, so the dye will get into the middle.

How do I get less texture and smoother colors?
The more stirring you do, the more evenly distributed the colors will be. Use a larger container and stir more often, especially in the first half hour of dyeing time. You may also want to use a cup or two (240-480 ml) more warm water to allow for more movement of the dye through the fabric and easier stirring. If you use more liquid with the same amount of dye, your results will be lighter values, so you may want to add more dye concentrate.

What are these blank, light-colored areas on my fabric?
The small ones are small air bubbles and the big ones are big air bubbles. You can take this into account when you decide how much movement of the fabric you will do, whether you will change the wrinkles and folds, and whether you will turn the fabric during dyeing. More marks are made by air caught in the fabric if the fabric is allowed to float without being stirred or turned.

How do you wash the fabric?
I try to minimize the hand work. First, I drain the fabric in the sink, then put it directly in a warm rinse in my machine. I let it agitate only 2-4 minutes and then empty the machine and spin. If there is a lot of dye in the fabric, I may do this one or two more times. I then start the machine on a hot wash/ cold rinse cycle with Synthrapol. I always wash it at least one more time this way to make sure all excess dye is removed. Your final wash should be 140°F (60°C). DO NOT LEAVE THE FABRIC PARTLY WASHED IN THE MACHINE because the dye may transfer.

Can I wash the light fabric with the dark fabric without staining the lights?
Yes. If I have both darks and lights, I want the light yellow to STAY light yellow, so I rinse and wring the colors separately and repeatedly in several changes of clean warm water before putting it in the machine. Using Synthrapol increases the chances of keeping the light fabric unstained.

Do I have to use Synthrapol?
Synthrapol SP is a concentrated surfactant (surface active agent) designed to help remove unfixed Procion® dyes. It makes my work easier by allowing me to wash lights and darks, blacks, reds, and yellows together, in fewer washes. It is pH neutral, so using it will not add alkali (the fixative for Procion® dyes) to your washout process. Just remember, your fabric isn't wash fast unless it passes the following test.

How do I test for wash fastness?
The combination of heat and moisture moves any unfixed dye. Iron the wet fabric on a hot setting over a piece of clean, dry, white cotton. If any unfixed dye is present, it will come through on the white piece. If it does bleed through, wash it again in a hot cycle, 140°F (60°C) with Synthrapol.

Will the dye stain my countertop and porcelain sink?
No. However, it may settle in the fine wear marks or grout and be hard to remove. Powdered cleanser has always worked on that for me.

What are the red specks on my fabric?
Each individual dye has different characteristics, one of them being its ability to dissolve. Red is the color I most frequently find that doesn't completely dissolve. Add more urea or more water to the concentrate and shake well to avoid this.

Why do I have to mix the black dye concentrate double strength?
Black is not just a color, it is also a value. It requires a lot of dye to make fabric look dark black. Less dye would give you gray. Remember that all Procion®MX blacks are mixtures of other Procion®MX colors. Some mixes use colors that are lighter in weight, and so require more volume of dye to make a darker color.

Why don't we use turquoise as a basic mixing color instead of blue?
The chemical that makes up turquoise in the Procion®MX dye series is a very large molecule and it takes more energy and time to make it work. When doing immersion dyeing, it produces darker colors with warmer water when left for 4-8 hours. For dye painting, darker color will result by letting the fabric cure at warmer temperatures for 24 hours. It is a color that cannot be mixed using two other Procion®MX colors and so I use it when I want to see turquoise, or a bright light mixed color. It is more expensive than some other blues and I do not use it for general mixing purposes.

What does "mercerized" mean?
Mercerization is a process using caustic alkali on the fiber when it is under tension. This word refers to the process that is done to the

thread before it is woven, but is now sometimes used to describe a process done to woven fabric soaked in alkali while it is under tension. Mercerization gives a slight sheen to the fabric and results in colors that appear about 25% darker. The fiber does not actually take more dye, but because the fibers are rounded by the process, there is more surface of the fibers visible to the eye. Because it is an extra step in the processing, mercerized fabric usually costs more.

What does the "PFD" label on the fabric mean?
"PFD" means "prepared for dyeing," that is, it has no surface treatments that will interfere with the dye process. It can refer to various weights, weaves or styles of fabric. It does NOT mean that the fabric has soda ash or other fixative on it, nor does it mean that the fabric is mercerized. If you buy PFD fabric, you do not need to prewash it, but you still need to use soda ash with Procion®MX dyes. Test dye any fabric that is labeled "for dyers" to see if the results are satisfactory to you.

What happens if I leave the fabric in the container longer than an hour after I added the soda solution?
It's fine for cotton. After an hour with soda, most of the color has reacted with the fabric or with the water. If you're busy, wait until tomorrow when you can get to it. Be more careful with silk because over time soda ash can damage the silk fibers.

Should I keep samples?

Consider keeping swatches and recipes, but remember, this is a very unpredictable process because there are several variables at work. How much did you stir? How warm was the fabric while the dye was curing? Exactly how much dye was in the spoon anyway? How big was the drop you used? A swatch taken from one corner of the yardage will probably look a lot different than one taken from another corner. DO NOT keep swatches if it will spoil your fun. The more dyeing you do, the more you will learn and remember about how the dyes work together.

If you do keep samples, it might help you to train your eye for future dye sessions. Include dye amounts, fabric amounts, amount of time dye and soda are on fabric, type and amount of mixing, etc. Color, value, and patterns on the fabric will never be matched using this method, but notes can be a guide.

A SAMPLE RECORD:

Date: January 5, 1997
Amount of fabric: 1 YARD
Amount of dye concentrate and water total: 1 CUP
Colors used: 1 tsp RED MX-5B
1 Tbs BLUE MX-R
2 Tbs YELLOW MX-3RA
Dye in: 2:05 (TIME)
Amount of soda solution: 1 CUP
Soda in: 2:20 (TIME)
Fabric out: 3:20 (TIME)
NOTES:

APPENDIX I: IMMERSION DYEING FOR SOLID COLORS

The following is one of the many recipes for mixing chemicals for immersion dyeing with Procion® MX dyes on cotton, silk, linen, and viscose rayon. Other recipes vary the proportions somewhat, but basically, the amount of dye, salt, soda, and water is determined by the weight of fabric. If you keep swatches and measurements, you can approximately duplicate a color.

RECIPE FOR ONE POUND (455 g) OF FABRIC:
One pound of muslin or broadcloth is about 3-4 yards (3-4 m) of fabric. For a 1-yard (1 m) recipe, divide the following amounts by four.

1. MIX

Warm water	2½ Gallons (9.5 liters)
Salt	2 to 4 cups (480-960 ml)
Dye	½ to 6 tsp (2-30 ml) dissolved in 2 cups (480 ml) water

2. ADD wet fabric. Stir 15 minutes for even color.

3. ADD to the dye/salt/fabric solution:

Soda ash	5 Tbs (75 ml) dissolved in 1 cup (240 ml) water

4. SOAK 1 HOUR. Stir frequently for even color.

5. RINSE and WASH HOT, 140°F (60°C) with
½ tsp (2.5 ml) SYNTHRAPOL
per pound (455 g) of fabric

APPENDIX II: DYE PAINTING RECIPES FOR SURFACE DESIGN TECHNIQUES *on cotton, rayon and silk*

STEP 1: Prepare the fabric.
Scour (if necessary) 1 lb (455 g), 3-4 yds (3-4 m), fabric by washing for 15 minutes in:

Hot water	over 140°F (60°C)
Soda ash	½ tsp (2.5 ml)
Synthrapol SP	½ tsp (2.5 ml)

Rinse well, and dry.

Soak DRY fabric in alkali solution made with:

Hot water	1 gallon (3.8 liters)
Soda ash	9 Tbs (135 ml)

Allow the fabric to dry or work on it wet.

STEP 2: Make the print mix.
Print mix, *shortcut method*. Stir together the following and wait about 1 hour:

Warm water	1 cup (240 ml)
PRO Print Paste SH	5½ Tbs (83 ml)

Print mix *from scratch*. Add the first two ingredients to the hot water, stir, add alginate slowly, stirring constantly, wait overnight for lumps to dissolve.

Urea	6½ Tbs (98 ml)
Metaphos	1½ tsp (7.5 ml)
Hot water	3 cups (720 ml)
Sodium alginate SH	0-6 tsp (0-30 ml)

Add water to make 1 quart (960 ml) total.

STEP 3: Mix urea water.
Use it to thin print mix to desired consistency.

Hot water	1 cup (240 ml)
Urea	2 to 3 Tbs (30-45 ml)

STEP 4: Mix the liquid dye concentrates.
Use a dust mask. Add ingredients in this order:

Do not dissolve dyes in water over 90°F (32°C).

Warm water	½ cup (120 ml)
Urea	1-2 Tbs (15-30 ml)
Procion®MX dye powder	1 Tbs (15 ml)
	2 Tbs (30 ml) for black

STORE in a cool place. The dye will keep its strength for about one week.

STEP 5: Mix dye stock and print mix.
Use equal parts of each for dark values. Use more print mix for lighter values.

STEP 6: Apply the dye mixture.
Brush, stamp, roll, screen or spray onto the treated fabric.

STEP 7: Cure.
Cure at room temperature, 70-110°F (21-43°C), 4 to 8 hours with a slight amount of moisture in the fabric.

STEP 8: Wash out excess dye.
Rinse thoroughly by hand if necessary in several changes of warm water.

Wash several times, using Synthrapol SP and continuous agitation.

Final wash should be in hot water, 140°F (60°C) or higher.

APPENDIX III: METRIC MEASUREMENTS

The measurements used for these dyeing recipes do not need to be more accurate than the following approximations.

VOLUME

1 teaspoon (tsp)	5 milliliters (ml)
1 Tablespoon (Tbs)	15 ml
1 cup (C)	240 ml
1 quart (qt)	960 ml
1 gallon (gal)	3.8 liters (l)

WEIGHT

1 ounce (oz)	28 grams (g)
1 pound (lb)	455 g

TEMPERATURE

Conversion formula:

$^{\circ}F = 1.8 \times C + 32$ or $^{\circ}C = F - 32 \div 1.8$

Room temperature	70-110°F	21-43°C
Warm water	70-90°F	21-32°C
Hot water	140°F	60°C

LENGTH

1 yard (yd)	1 meter (m)
¼ yard	25 cm

APPENDIX IV: SOURCES

Codes for products available at each supplier:
1 — fabric • 2 — MX dyes • 3 — tools/supplies • 4 — books

Dharma Trading Co.
P. O. Box 150916
San Rafael, CA 94915
(800) 542-5227 • (415) 456-7657
www.dharmatrading.com
1, 2, 3, 4

PRO Chemical and Dye, Inc.
P.O. Box 14
Somerset, MA 02726
(800) 228-9393 • (508) 676-3838
www.prochemical.com
1, 2, 3, 4

Exotic Silks
1959 Leghorn Street
Mountain View, CA 94043
(800) 845-7455, U.S. • (650) 965-7760, CA
www.exoticsilks.com
1

Testfabrics
P.O. Box 26
West Pittston, PA 18643
(570) 603-0432
www.testfabrics.com
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