

workshop handbook clay projects and studio resources

| Second Edition |



knowledge and techniques for the studio

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workshop handbook

clay projects and studio resources

knowledge and techniques for the studio

Welcome to your workshop! Whether you're a wheel thrower, a handbuilder, a glaze-testing geek, or all of the above, we've pulled together several ceramic projects and references you can use in your own studio. The articles in **Workshop Handbook: Clay Projects and Studio Resources** are a selection of project ideas that are meant to be a ceramic workshop in print—except you can take this one into your own studio and refer back to the clay projects as needed.

So pick a project and get in the clay studio!



Copper Oxide

John Britt

Copper oxide produces a wide range of colors in glazes, from greens, to red, pink, blue, black, yellow, and lusters. Discover how you can make it work for you.



Sewing Cultures through Pottery

Lauren Karle

Taking influences from Guatemalan textiles, Lauren Karle creates surface designs and layers pigments prior to forming her pots resulting in pieces that appear to be made of fabric.



Material, Form, and Function

Billy Lloyd

Create functional vessels with clean lines using techniques from studio potter and designer Billy Lloyd.



Roulettes from Texture Mats

Russel Fouts

Roulettes are a great way to create textures on your surfaces, and artist Russel Fouts shares a great tip for making these difficult-to-design tools.



Smooth Color Blends

Chris Campbell

Blending two colored clays as a gradient challenged a former NASA software engineer named Judith Skinner who solved the problem. Chris Campbell reveals the skinny on the technique.

copper oxide

by John Britt

Copper oxide is an active metal that combines easily with oxygen, which means that it is very sensitive to oxidation and reduction atmospheres. It produces a very wide range of colors in glazes, from greens (delicate light greens to turquoise to deep emerald green), to red, pink, blue, black, yellow, and copper luster.

Defining the Terms

Copper Oxide—Black Copper Oxide (Cupric) CuO ; melts at 2419°F (1326°C). Red Copper Oxide (Cuprous) Cu_2O ; melts at 2255°F (1235°C). Cupric oxide decomposes at 1847°F (1008°C) to cuprous oxide and oxygen. It is an active flux, so adding it to a glaze may cause the glaze to run. It has a high coefficient of expansion/contraction, which may increase crazing in larger amounts. It is toxic, volatile (fume hazard), and can leach into food. It can migrate through a clay body, and almost any copper glaze with a matte black surface will leach copper in the presence of acidic liquids. It can also cause pinholing.

Copper Carbonate—The idealized formula for this green powder is CuCO_3 , but the material may come as a variety of compounds and may contain impurities. $\text{Cu}_2(\text{OH})_2\text{CO}_3$ (Malachite) may be a more accurate formula representation. Since it is reactive chemically, it disperses better in a glaze thus giving more even results than copper oxide. It off gasses and can cause pinholes or blisters in a glaze. At approximately 572°–608°F (300°–320°C) copper carbonate releases carbon dioxide and water, and then at 1922°F (1050°C) it loses more oxygen as it restructures. Copper carbonate makes greens in amounts of 5% or less, blacks above 5%, and at 0.3–0.8% it makes blues in oxidation and copper reds in reduction. Approximate conversion: 5% copper carbonate = 3.6% black copper oxide = 3.24% red copper oxide.

Copper Sulfate—This blue crystal is an agricultural fungicide. It is soluble in water, starts decomposing at 302°F (150°C), loses four water molecules by 392°F (200°C), then changes to copper oxide and sulfur trioxide by 1202°F (650°C). Often used in pit and low-temperature saggar firings. Produces grays in soluble salt firings as well as pinks and reds in heavy reduction.

Copper Chloride—Often used in water soluble metal salt firing (aka *water coloring* on porcelain). Produces burgundy colors in pit and saggar firings.

Copper Filings—Chips of copper metal. Copper filings are sometimes sprinkled in or on a wet glaze to give black spots with flashes of red on the perimeter.

Sourcing Copper

Copper was one of the first metals worked by humans (6000–4000 BCE). It shows up in glass as early as 2000 BCE and in glazes of the Han Dynasty (200–25 BCE).

Some of the most famous copper green glazes are known as Oribe, which comes from Furuta Oribe, a general and tea master during the Japanese Keicho period (1596–1615 CE). Another popular copper glaze is a copper red. It most likely came about from the accidental reduction of copper green glazes fired in a wood-burning kiln. Some of the early sources of copper in glazes are believed to be from spraying water onto hot bronze. This produces a black flaky substance composed of copper oxide and tin oxide (the metals in bronze), which was then finely ground and used to produce copper reds. Copper red colors include strawberry, oxblood, flambé, black-red, peach bloom, apple red, rose carmin, etc.

There are four major sources of copper in glazes: Black copper oxide (CuO); red copper oxide (Cu_2O); copper carbonate (CuCO_3); and copper sulfate (CuSO_4), which dissolves in water. Each has different properties that can make a significant difference in the outcome of the glaze. Copper carbonate is the most commonly used form. It disperses well in a glaze slop and melts well in glazes to give uniform color. Black copper oxide has a larger particle size that doesn't melt well and can cause specking in glazes. Red copper oxide is the strongest form and has a hydrophobic coating (oleic acid surfactant) that keeps it from reoxidizing in the air. Because of this coating, it won't mix with water and simply floats on the surface. This can be corrected by adding several drops of liquid soap, which breaks the surface tension and allows it to disperse.

Copper Glaze Tips

Oribe pieces are decorated on one side with an iron oxide design over a transparent glaze while the other side is decorated with a transparent copper green glaze. Then they are fired in oxidation. Oribes can get a scummed layer on top that dulls the color. The traditional method for getting a clearer copper Oribe is to soak chestnut husks in water and then soak the pots in this acidic solution. But today potters just use a weak muriatic acid (hydrochloric acid) solution. (This is toxic so use in a well-ventilated area with safety glasses and a mask.)

Copper volatilizes above 1877°F (1025°C) and becomes increasingly volatile, making it a fume hazard. The volatilization can affect adjacent pots, particularly those with tin whites or celadons, resulting in a pink blush. This property can also be used to decorate a pot. Glazing the inside of a saggar with an Oribe glaze and then placing a tin white glazed tea bowl in the saggar will give a delicately blushed pink tea bowl.

Copper glazes are often used in soda and salt firings because the introduction of volatile sodium during the firing turns copper glazes various shades of blue/turquoise/green. Sometimes potters use high amounts of copper (10%) in a green salt glaze, which turns black, but when the salt fumes hit that part of the pot, the area turns deep green on one side with the other side of the pot fading to black.

Raku: With sufficient post-firing reduction, the copper oxide/carbonate can be reduced to metallic copper finishes. These copper lusters are only microns thick so they can reoxidize to produce green colors (much like a penny oxidizes) if the pots aren't coated with a polyurethane sealant.

Copper is also used in Islamic luster firing techniques as well as Egyptian Paste (ancient Faience), which is a self-glazing, low-fire clay body that goes back 7000 years. It was probably discovered by firing sand, clay, and salt or soda ash. Then colorants were added to make colorful beads and ornaments.

black/green

V.C.A.A. COPPER
Cone 10 Reduction

Cornwall Stone	46 %
Whiting	34
Silica	20
	<u>100 %</u>
Add: Tin Oxide.	4 %
Copper Carbonate	4 %

Apply thin for a speckled green or thicker for a mottled black. Both applications shown here on porcelain.



green

PATSY'S GREEN (ORIBE)
Cone 10 Oxidation

Gerstley Borate	13.4 %
Dolomite	5.9
Whiting	8.3
Zinc Oxide	4.0
F-4 Feldspar	46.2
EPK Kaolin	2.4
Silica	19.8
	<u>100.0 %</u>
Add: Black Copper Oxide	4.0 %



purple

JEFF'S RED (UNDER ORIBE GLAZE)
Cone 10 Reduction

Barium Carbonate	4.4 %
Dolomite	8.7
Whiting	8.4
Ferro Frit 3134	8.7
Custer Feldspar	41.9
Zinc Oxide	1.7
Silica	26.2
	<u>100.0 %</u>
Add: Bentonite	1.0 %
Copper Carbonate	0.5 %
Tin Oxide.	2.6 %

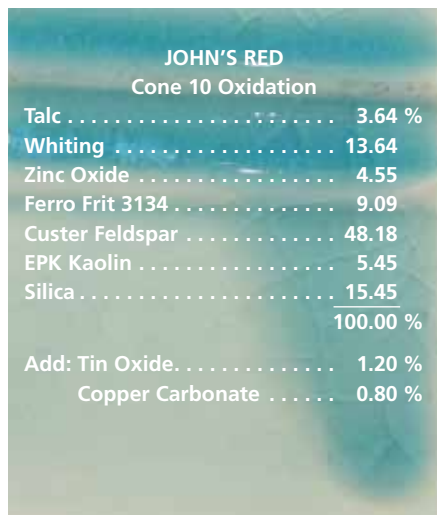
Jeff's red is fired once then reglazed with an Oribe glaze and fired again.



blue/turquoise

JOHN'S RED
Cone 10 Oxidation

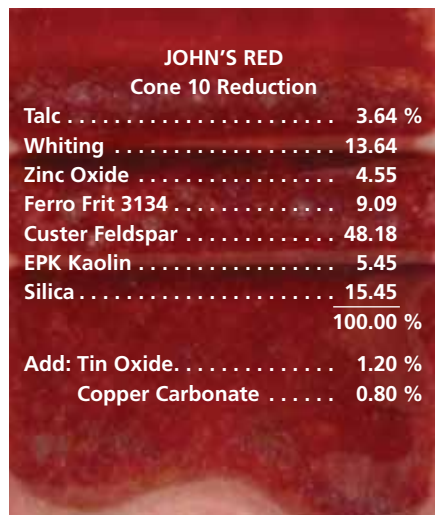
Talc	3.64 %
Whiting	13.64
Zinc Oxide	4.55
Ferro Frit 3134	9.09
Custer Feldspar	48.18
EPK Kaolin	5.45
Silica	15.45
	<u>100.00 %</u>
Add: Tin Oxide.	1.20 %
Copper Carbonate	0.80 %



red

JOHN'S RED
Cone 10 Reduction

Talc	3.64 %
Whiting	13.64
Zinc Oxide	4.55
Ferro Frit 3134	9.09
Custer Feldspar	48.18
EPK Kaolin	5.45
Silica	15.45
	<u>100.00 %</u>
Add: Tin Oxide.	1.20 %
Copper Carbonate	0.80 %

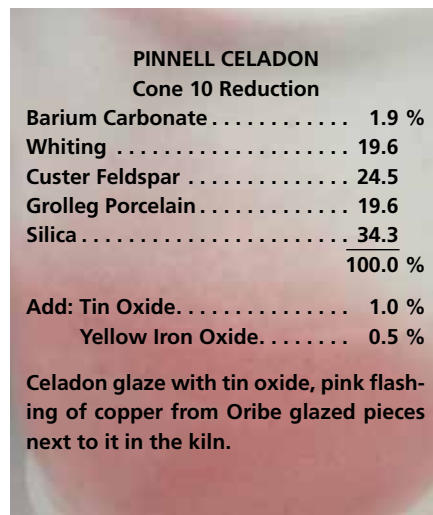


pink

PINNELL CELADON
Cone 10 Reduction

Barium Carbonate	1.9 %
Whiting	19.6
Custer Feldspar	24.5
Grolleg Porcelain	19.6
Silica	34.3
	<u>100.0 %</u>
Add: Tin Oxide.	1.0 %
Yellow Iron Oxide.	0.5 %

Celadon glaze with tin oxide, pink flashing of copper from Oribe glazed pieces next to it in the kiln.

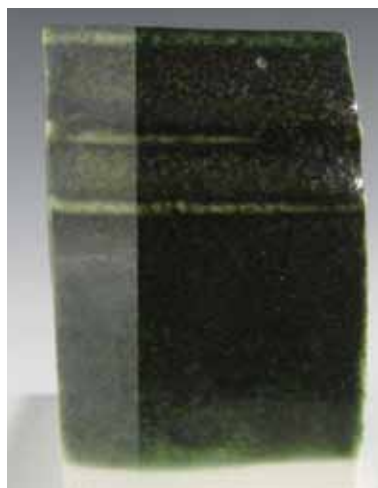


Toxicity

While there is no legal limit set for safe leaching of copper in glazes, potters should be aware that the legal level of allowable copper deemed safe for drinking water is 1.3 mg/L (based more on its effects on taste than toxicity). Levels of above 5% can create black metallic surfaces and should not be used in functional ware.*

Excessive amounts in a glaze can be leached with prolonged or repeated contact with acidic foods or beverages. The extremely basic conditions in dishwashers can attack a glaze surface, causing erosion of the surface and resulting in increased leaching over time.

*Digitalfire Reference Database, <http://digitalfire.com>.



The tile to the left, glazed with Willie Helix, was soaked in muriatic acid for 48 hours to simulate an acidic environment and show possible leaching, which has occurred and is noticeable on the left side.

WILLIE HELIX

Cone 10 Ox. or Red.

Nepheline Syenite	40.0 %
Whiting	19.0
Kaolin	11.0
Silica	30.0
	<u>100.0 %</u>
Add: Copper Carbonate.	1.2 %
Black Copper Oxide	5.0 %

Sewing Cultures through Pottery

by Lauren Karle



Mug, 5½ in. (14 cm) in length, handbuilt earthenware, slip-transferred pattern and copper carbonate hand-painted slip, cone 03 oxidation, 2012.

Handmade objects are a reflection of people and place long before the separation of utility from beauty. Nowhere is this more true than in the garments of the indigenous cultures of Guatemala and Mexico. Huipiles, or Mayan blouses, relate ancient and modern histories through their weave and designs that combine patterns. After being surrounded by these textiles during the 2½ years I lived in Guatemala, I see them as symbols of identity and protectors of culture. Like

them, I create objects that are culturally functional in addition to being useful in everyday life. My current palette references Latin American color combinations. By using color and pattern as cultural signifiers, my intention is to create pots that demonstrate unity within diversity. I seek to unify different cultures by combining timeless traditions and modern interpretations through visual and metaphorical layering.

A pot embodies a specific feeling when all its elements speak to one thing. I harmonize the lip, feet, seams, handle, surfaces, and interior, exterior, and negative spaces. Imagining cloth wrapping around the form of a person, I try to give my pots volume from within. I dart, alter, cut, and join pieces of clay as a tailor creates a garment. Nature is another source of inspiration as pattern and parts come together in elegant ways.

Preparing a Slab

To make a mug, I begin by rolling out a thin slab of red earthenware, a medium that I prefer for its rich color, its long tradition in Latin America, and its association with the common person. Eddie Dominguez taught me to roll a slab between two pieces of bed sheet, a technique that allows me to easily flip the slab and roll both sides. When the slab is an even, ¼-inch thick, I lay a pattern on top and carefully cut out a 13×4½-inch rectangle. When it is ready, I run a rib over it to smooth and compress the clay.

The lip of a cup is the most intimate point of connection with the user, so it is essential to give it a physically pleasing form before applying the pattern. I flatten and compress one of the long edges with a roller and rib (1—see page 12) and flip the slab repeatedly to create a curve that comes gently to a point.

For the handle, I cut two strips about ¾ of an inch wide by 6 inches long, then use a roller to make these even thinner, since they will be layered on top of one another. As with the lip, I smooth the edges of the handle so that they form a gentle curve for the user's hand (2). In addition, I cut a 3-inch square for the base.

Decorating the Surface

On the surfaces of my pots I capture some of the qualities of the huipiles, which have a multitude of different patterns that work together visually. By situating regular slip-transferred patterns next to painterly marks, I emulate the contrast of the tight weave of fabric and hand-sewn decoration. I combine the earthenware hues of pre-Colombian vessels with bright colors of contemporary Latin America.

It is essential to layer the surface of a cup while the slab is still flat and wet. There are infinite opportunities to experiment with the order and quantity of layers, but I usually start with a low-fire white slip with the goal of making the underglaze or wash brighter. The underglaze or wash can be applied as a solid background color, a gradient, or a series of painterly strokes (3). I always consider the pot and how color will flatten or enhance the form, highlight seams, or create an illusion of depth.

Once the background is no longer shiny, I apply a pattern through slip transfer, a simple and gratifying technique that



Mug, 5½ in. (14 cm) in diameter, handbuilt earthenware, slip-transferred pattern, cone 03 oxidation, 2012.

I learned from Charlie Cummings. First, I create a black-and-white pattern on the computer by altering a picture in Photoshop, creating a pattern by hand and scanning it, or finding an existing pattern. Then I print the inverse of the pattern using a laser printer on regular printer paper. An ink-jet printer will not work, since ink does not have the resistive properties of toner. Slip sticks only to the white areas of the image, which are the parts that will transfer.

I deflocculate the colored slip to brush on the pattern using one drop of Darvan 7 per cup of slip. Sodium silicate also works. Deflocculating the slip keeps the color intense but negatively charges the clay particles so that they slide over each other, making the slip flow more easily with less water content. In sweeping strokes, I brush the deflocculated slip over the pattern. The slip sticks to the white paper and pulls back from the laser toner. If the slip bridges from one white section to another over the toner, I just touch it gently with a finger and it immediately recedes (4).

I cut several sizes from the patterned paper, to match the size of each of my slabs, and coat them with colored slip (5). When the slip on the pattern is leather hard, I lay it face down on a prepared background. If the slip is still shiny, it will smear and blur; if it is too dry, it may flake off the page. I press it smoothly onto the clay and brush a little water onto the back (6). The water causes the paper to lie flat and helps the slip release onto the slab. The perfect amount of water will barely saturate the laser ink, so you can see the pattern through the back of the paper. I use a rib to compress and smooth the back of the paper (7), then peel a corner back to check how well the pattern is transferring (8). I brush more water on the back or rub the paper if necessary. How clearly the pattern transfers and where depends on the balance of these techniques. I continue to check it until it has transferred to my satisfaction and I can remove the whole paper. It is possible to print patterns on top of patterns, rotate, flip, block out sections, paint over parts, and experiment endlessly with layers.

Pair of mugs, 5½ in. (14 cm) in diameter each, handbuilt earthenware, slip-transferred pattern, cone 03 oxidation, 2012.

Another option is to juxtapose patterns made by hand with the regularity of printed patterns. In this case, I use a copper carbonate low-fire slip to paint horizontal lines around a cup (9). Copper carbonate has beautiful qualities that naturally create depth and variation in value. Another option is to paint line-and-dash patterns directly on raw clay with a wash. I use combinations of these techniques and materials to create a composition on the outside, inside, handle, and base of the cup.

Building the Form

When the surface is no longer tacky, I start building the form by creating a cylinder. I always cut the joining edges at an angle to make a stronger joint with a greater surface area. I score with a serrated rib, add a small amount of water with a paint brush, and score again (10). This creates slip in the joint without adding



more volume that will squeeze out along the edge and ruin the surface pattern. I wiggle and press the two sides together to secure them, then turn the cup upside down to measure five equally spaced darts (11). Using a pattern, I cut an equilateral triangle where each dart belongs (12). It helps to angle the blade slightly out from the triangle when cutting to make the two edges flush when attached. I bend the flanges inward and attach them using the same method. It often helps to use a rib at the intersection to change and define the angle of the slab to lessen the potential of cracking (13). I compress the joints without rubbing the pattern on the outside and smooth and secure the joints from the inside.

After stepping back to consider other adjustments in the form, I push outward from the inside, slightly curving the walls of the cup to make it look full, and pinch or shape it.

To build the handle, I lay a thin strip of raw clay over my fingers to create a curve, then lay the decorated strip over this slightly wider raw strip and attach them (14). Because they have been curved in advance, less stretching occurs and therefore less cracking. I shape the handle and let it set up to a soft leather-hard state, then hold it up to the body of the cup and cut to the desired length, considering the angle of each attachment. After holding it up for a dry fit, I attach it securely (15).

Finishing the Inside

In order to turn an industrial utensil, which forbids extravagance, into a ritual object, I embellish the inside of a cup with surprises and add small details. Before attaching the base, I place the cup on the wheel and apply a generous layer of slip to the inside as it turns (16). I set the cup on the decorated three-inch square slab and trace the inside pentagonal opening that was created by darting the cylinder bottom. When I cut the shape, I keep the knife blade at an outward angle to create a small pedestal for the cup (17). To avoid gaps at the joint, I attach the base in the same orientation as I traced it. As with the darts, I compress the inside without rubbing the pattern, then carefully seal the outside (18).

I slip-trail a bead along the inside darts (19). By using the same color of slip that was applied on the wheel, I acknowledge the seams without highlighting them. I also enjoy the contrast in line quality between the slip applied on the wheel with the slip applied by hand.

Last, I add my signature by slip-trailing it backwards on newspaper. When the slip is leather hard, I press it on the bottom of the pot (20). As when transferring the pattern, I brush on a small amount of water and



Glass, 6 in. (15 cm) in height, handbuilt earthenware, slip-transferred pattern, sprigs, cone 03 oxidation, 2011.

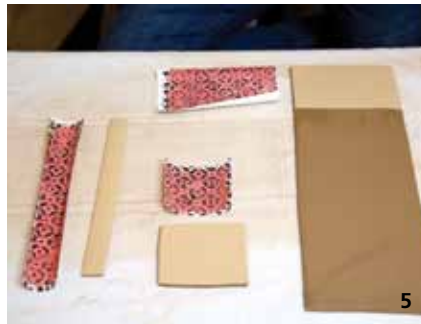
rub it with a rib. When transferred onto the pot, the signature will read correctly. I choose to use my first name with the goal of making my pots more personal.

Firing and Glazing

I wrap the cup in plastic and let the moisture equalize for at least a day, then slowly allow it to dry. After bisque firing the cup to cone 02, I apply a thin layer of clear glaze. Depending on my chosen composition, the beauty of the natural clay allows me to leave some areas unglazed. The final cone 03 glaze firing enriches the colors and makes the cup food safe.

The purpose of my forms and carefully layered surfaces is realized through the use of my pots. My pots are embedded in a tradition that unites people, preserves culture, and conveys the beauty of history.

To see more of Lauren Karle's work check out <http://laurenkarle.com/home>.



- 1 Roll out an even ¼-inch slab, cut out the pattern, and create a lip using a roller or a rib while continuously flipping the slab. This creates a smooth curve that gently comes to a point.
- 2 Make two thin strips for the handle, smoothing the edges to form a gentle curve where the user's hand will contact it.
- 3 Coat the sides, base, and handle while they are flat. Start with a white low-fire slip so what is put on top becomes brighter. Apply an underglaze or wash over as a solid background color.
- 4 With quick brush strokes, apply a deflocculated slip over the laser ink pattern. The plastic quality of laser-printer ink will resist deflocculated slip—making it stick to the white paper and pull back from the ink. If the slip bridges from one white section to another over the ink, just touch it gently with a finger and it will immediately recede.
- 5 All the pieces and parts of the cup are prepped, dry, and ready to assemble.
- 6 When the slip on the pattern is leather hard it is ready to transfer onto the prepared background. Press the paper smoothly onto the clay and brush enough water on the back to barely saturate the laser ink—you will see the pattern through the back of the paper.
- 7 Use a rib to compress and smooth the back of the paper to help the slip transfer onto the slab.
- 8 Peel a corner back to check how well the pattern is transferring. Brush more water on the back or continue to rub if necessary. The clarity of the transferred pattern depends on the balance of these techniques.
- 9 Paint horizontal lines of a colored low-fire slip to give depth and variation around the cup.
- 10 Cut the joints at an angle, score them, add a small amount of water, and score again. This creates slip in the joint without adding more volume that will squish out along the seam and ruin the surface pattern. Press the two sides together to secure them, creating a cylinder.
- 11 Measure five equally spaced sections around the bottom edge. An MKM Decorating Disc is a useful tool that can equally space any number of sections in concentric circles.
- 12 Use a pattern to cut identical equilateral triangles where each dart belongs. It helps to angle the X-Acto blade slightly out from the triangle when cutting so the two edges will meet flush.
- 13 Use a rib to gently bend the flanges in. Then join each dart using the same score, water, score method. Compress the joints without rubbing the pattern on the outside.
- 14 Create a small curve with the thin strip of raw clay. Layer the decorated strip over it and attach them. By attaching them after they curve, less stretching occurs and therefore less cracking.
- 15 After shaping the handle and letting it set up to a soft leather hard, hold it up to the body of the cup and cut at the desired length and angle. Score the cup and handle, add water, score, and attach securely.
- 16 Prior to attaching the base, apply a layer of white slip to the inside while the cup is slowly spinning on the wheel. Set the cup on the decorated 3-inch square base and trace the shape of the inside opening.



PROCESS PHOTOS: CHASE BRAZZLE



- 17 Cut on the lines you traced, keeping your X-Acto knife blade at an outward angle. The angle will match the bottom angle of the cup for a secure fit and provide a small pedestal.
- 18 Attach the base in the same orientation you traced it to avoid gaps. Similar to the darts, compress the joint without rubbing the surface pattern. Carefully seal the outside.
- 19 Slip-trail a bead of slip along the darts on the inside. Use the same color slip to acknowledge the seams without highlighting them. These lines will contrast nicely with the regularity of the slip applied on the wheel.
- 20 Last, I slip-transfer my signature on the bottom of the pot. By slip-trailing my name backwards on newspaper it reads correctly after transferring it onto the bottom of the pot.



PHOTOS: WAYNE KIRK WWW.WAYNEKIRK.CO.UK

Material, Form, and function

by Billy Lloyd

I first started making porcelain tableware during my apprenticeship with leading potter and writer Julian Stair at his London studio. Prior to that, during my three years at Camberwell, I was encouraged to develop a conceptual line of inquiry, which leaned more towards a sculptural rather than functional approach. Combining throwing and handbuilding, I produced robust geometric forms, softened by the textures of the grogged brick clays and stoneware bodies that I had adapted. Function nonetheless played an important part in the development of my ceramics; I drew inspiration from mass-manufactured products, materials, and processes and, consequentially, developed a strong industrial aesthetic.

At present, I make thrown porcelain tableware intended for use. My aim is to combine a clarity of design with the nuances of making by hand. I use porcelain because of its density and strength when fired, the purity of its color and ability to enhance form. To ensure that my tableware is robust enough to endure the demands of consistent use, a generosity of material and form has been applied—walls are thick and handles are comfortable to hold with confidence. It is of equal importance, however, that the process used to produce the work is conspicuous in the resultant form. Although I strive for consistency, the thrown nature of my pots means that one piece will always be slightly different from the next and I have learned to work with that rather than against it.

Making a Lidded Jar

Reductive Design

One of the defining features of my ceramics is its clarity of design. Balancing material, form, and function is a fascinating objective. My pots are stripped of any superfluous embellishments that would detract from the graphic profile I aim to achieve. This notion is echoed in the collective use of form—currently, I use one shape from which a whole range of tableware emerges—a conical form that can be inverted to flare. In applying this economy, a positive coherency and structure is apparent throughout the range.

Questions and Associations

While a distinct reduction of form is apparent in my design aesthetic, I am intrigued by the seemingly endless possibilities of combining material, form, and function. Take a simple everyday object, such as a mug for example. It is a vessel that contains a volume. It has an interior and an exterior, a base, a foot, a handle, and a rim. The wall is of a certain thickness, and so the mug is a certain weight. It could be cylindrical, oval, square or triangular in form. Is it symmetrical? Does it have a curved or straight-sided profile? It is colored, patterned, rough, or smooth? Only when you start to deconstruct an object do you realize the multifaceted nature of designing and making functional work.

I hope that my pots encourage people to re-examine our associations with the belongings we choose. What is its purpose? What is it made of? How is it made? What does that mean to me? These are some key questions that shape my understanding of the material world we live in.

The glazed porcelain lidded jars illustrated here embody re-occurring themes within my tableware—a concern for scale, proportion, and repetition. The notion and delivery of scale can be complex, but if you can design and make an object that has as much impact on a small scale as it does upon enlargement you will have achieved a refined object of elegant proportions. I often create and display small groups of pots (jugs, bowls, or lidded jars for example) ascending in scale as a means of demonstrating this. This arrangement also refers, not entirely but in part, to a modular format I have adopted with some of my pieces—mugs stack on top of each other and bowls nest inside one another. In doing so, the pieces echo the collective use of a singular form and the repetitive nature of batch production.

Throwing

Center a ball of porcelain for the jar. When throwing the jar, an appropriate height is usually achieved in three pulls (*figure 1*). Throw the gallery by pressing down on half of the rim with a straight-sided steel kidney rib (*figure 2*). This should be done at a relatively slower pace compared to the throwing of the vessel. Measure the width of the jar's gallery with calipers (*figure 3*) and save the measurement for use when throwing the lid.

Throw the lid as a low, thick cylinder. Use the caliper measurement as a guide for the diameter of the flange that sits down inside the pot. With a wooden rib, press down on the outer half of the thick rim, defining the flange (*figure 4*). Ensure the width of the flange is the same width as the jar's gallery, checking with the calipers again (*figure 5*). Remove excess clay from the sides of the lid, using the outside diameter of the jar's rim as a guide. The closer the lid is to being finished at this stage, the less trimming there is to do later on. Refine the lid's flange with a steel kidney (*figure 6*).



1
Throwing the jar. An appropriate height is usually achieved in three pulls.



6
Remove excess clay from the lid and refine the lid's flange with a steel rib.



7
Trim the exterior wall of the leather-hard jar using a ribbon trimming tool.



2
Throwing the gallery with a steel rib.



3
Measuring the width of the jar's gallery with calipers.



4
Throwing the lid's flange with a wooden rib.



5
Matching the width of the flange to the jar's gallery.

Trimming

After the jar has dried to a leather-hard state, place it upside-down on a centered chuck that fits the interior diameter. Trim the exterior wall of the jar with a ribbon turning tool to remove excess clay (*figure 7*). Refine and straighten the exterior wall of the jar with a straight-sided steel rib (*figure 8*). Trim a foot-ring into the base (*figure 9*). For my work, I also trim a central location for my stamp using a narrow steel kidney. Flip the jar over and trim an angle into the rim of the jar and refine the gallery (*figure 10*).

Place the lid onto the jar and assess the fit (*figure 11*). Next trim the top of the lid with a steel turning tool (*figure 12*—the tool pictured here was bought for me in Japan by Lisa Hammond in 2006). Place the lid upside down on a chuck (this one is a flared out cylinder that supports and stabilizes the lid securely) and trim the flange and refine the interior (*figure 13*). I am looking for a relatively tight fit, however, some tolerance is necessary to avoid a fusion of the two components during the glaze firing.



8
Refine and straighten the exterior wall using a straight steel rib.



9
Trim a foot ring into the base. Add a trimmed circle for a stamp.



10
Trim an angle into the rim of the jar and refine the gallery with a rib.



11
Place the lid onto the jar and assess the fit of the rims and of the lid flange.



12
Trim excess clay from the top of the lid with a steel turning/trimming tool.



13
Using a flared chuck for support, trim the lid flange and refine the interior.



14
Align the lid and jar, trimming the exterior walls using a steel kidney.



15
Stamping my B (a metal letterpress) onto the trimmed circle on the base.

Align the lid and jar, this time placing the jar upside down onto the lid, supported by the chuck. Trim the exterior walls using a steel rib (*figure 14*). It is important that the exterior profile, spanning the jar and the lid, is continuous. The last step for me is stamping my B (a metal letterpress) onto the central location (*figure 15*). A flat-ended rolling pin is used to brace the interior of the base to ensure the clay does not crack when I press down into the clay with the stamp.

Lastly, place the lid onto the jar, and clean up the exterior surface with a wet sponge. The lidded jar is now complete and ready to dry slowly over the course of a week.

Glazing

I use a clear glaze (a recipe that was kindly donated to me by Julian Stair), which enhances the whiteness of the porcelain while adding to the functionality of the object.

Using my wheel as a turntable/ banding wheel, I brush wax resist onto the foot ring, the lid's flange, and the jar's gallery to minimise any potential glaze adhesion to them and therefore the kiln shelf. There are two other reasons for this: Aesthetically, I appreciate the contrast between a glazed and unglazed surface and the fact that the contact points of the jar and lid refer to my chosen material—porcelain. Also, it means that I can fire the lid in position and therefore minimise any potential warping that can often occur with porcelain at high temperatures.

Secondly, I pour glaze from a jug into the jar. As I pour it out, I turn the jar in my hands to ensure an even distribution. The jar is then left to dry (ideally overnight) before I glaze the exterior so the glaze absorption is not affected by excess water from the interior. Meanwhile, I turn my attention to the lid, which is glazed in a similar manner to the jar: the interior is glazed first (as the lid is shallow, I fill it to the brim before pouring out)

before the exterior is dipped into the glaze. The dipping here is carefully done in a sweeping motion so as not to amass a build up of air bubbles on the top surface of the lid. The bubbles can ultimately be rubbed down if necessary but if they can initially be avoided then it saves time further down the line. Now that the jar has dried out I can glaze the exterior: I firmly brace my index, middle, and ring fingers (from both hands) on the interior of the jar. The jar is picked up and dipped (initially at a slight angle before straightening to ensure no air bubbles occur on the base, a process similar to glazing the outside of the lid) into a bucket of glaze in an upright position at a steady medium pace. Carefully, I stop the descent into the glaze once the jar is submerged up to the rim so as no glaze spills into the interior. I hold it in situ for three seconds before taking the jar out of the glaze and onto a steady surface to dry.

Finally, I rub down any drip marks or air bubbles with my finger or a flexible stainless steel kidney rib and wipe away any excess glaze that may have found its way onto the foot-ring, the lid's flange or the jar's gallery. The lidded jars are then packed into my electric top-loading kiln and fired to 2300°F (1260°C) at a rate of 212°F(100°C)/hr to 1112°F (600°C) then 392°F (200°C)/hr to 1260°C with a 15-minute soak. Once the contents of the kiln have cooled to touch, I sand the unglazed surfaces on the jar and lid with wet and dry emery paper (under water) to leave a smooth, tactile surface.

Billy Lloyd is a studio potter living in London, England. He completed a Ceramics BA at Camberwell College of Art and Design (2003–06) and an assistantship with soda-firing potter Lisa Hammond at Maze-Hill Pottery, followed by an apprenticeship with Julian Stair (2007–11). He currently has studio at Cockpit Arts in Deptford, London, where he was awarded the Cockpit Arts Award in 2011. To see more of his work, visit www.billylloyd.co.uk.

Roulettes from Texture Mats

by Russel Fouts

There are many commercial roulettes (rolling stamps) available for making bands of texture on your work, and a number of ways to make them on your own as well. This technique uses commercially made texture mats (*figure 1*) to make quick, fun roulettes.

Start with a short, thick coil of clay a bit longer than the texture sheet and thick enough that when you flatten it out, it will be a bit wider than the sheet. Flatten out the coil. You want the clay a bit thick so it doesn't deform too easily but not so thick that you can't bend it easily.

Place the texture mat face down on the slab and use a roller to carefully press the sheet into the clay. The curved type of pony roller works well. Try to press the sheet into the slab without the clay moving under it too much. Keep going until the sheet is flush with the surface of the slab. There should only be a slight gap between the edge of the sheet and the clay. If there's more, then that means that the clay may have moved too much.

The whole surface, sheet, and clay, should be as perfectly flat as you can make it but don't get too obsessed. Lightly dropping the slab face down on the bench can help but don't drop it too hard or too many times.

Trim away the extra clay from the sides using the sheet as a guide. Try to keep your tool as perpendicular as possible. Cut the ends on 45° angles using the sheet as a guide. The angle of the cut on each end should be relatively close. Carefully peel the texture mat away from the slab (*figure 2*).

Very carefully bend the slab into a ring, disturbing the texture and the edges on the face as little as possible. Score and slip, then

match up the edges and join them. There will almost always be a gap where the texture begins and ends. It may be possible to smooth this to make the ends of the pattern appear to flow into each other, however, I find the simplest way to deal with this is to make it a clear division. Make a small, fine coil and join it into the gap. Break off the ends of this coil and clean them up (*figure 3*).

When the roulette is finished, it's time to do some clean up and refinement. If you find the surface a bit concave, gently press it out from the inside to make the face flatter and pinch in the inside edges. Clean up and slightly round the edges of the face so that when you use the roulette, the pattern will 'join' up better from side to side and won't show edge lines. You can make any additions to the surface by adding more clay now or by carving when leather hard.

Once the roulette is completely dry, test it on a soft slab of clay to see if the pattern it makes works for you or if you need to make any further modifications.

When the roulette is completely bone dry, bisque fire it to your normal temperature, starting with a long candling preheat (with a maximum temperature of 200°F) since it is thick. This allows any extra moisture to be dried out slowly. If the bisque-fired stamp becomes damp from lots of repeated use at one time, sprinkle corn starch on the surface to help it to release from your clay.

Russel Fouts is a ceramic artist living in Brussels, Belgium, and a frequent contributor to PMI. To see his work, visit his website: <http://users.skynet.be/russel.fouts>.



1 The patterns on these commercially-made texture sheets can be easily turned into roulettes.



2 Peel the texture mat away from the clay slab. Don't let the slab dry out.



3 Bend the slab into a ring, slip, score, and join the edges. Make a small, fine coil and join it into the gap.

Smooth Color Blends

by Chris Campbell



I've been working with colored clay since 1990 and teaching workshops on the topic for more than ten years, so I can vouch for the fact that producing beautiful color blends can be a slow and labor-intensive process. Even after years of experiments, I still wasn't able to find a way to blend colors without visible lines between hues. As I searched for alternate methods of coloring clays, I noted the color blends in polymer clay pieces flowed smoothly from one to the other. So I narrowed my hunt and quickly found the answer—Skinner blends.

What's a Skinner blend? In 1996 Judith Skinner, a former NASA software programmer and polymer clay artist invented a technique to quickly create graduated or continuous color blends. Her process is so simple that she did not give much thought to its importance at the time, but as others saw her work, they rapidly adopted her process. The polymer clay world has so completely incorporated it that you'll seldom find a contemporary piece created without using a Skinner blend.

I decided to try this technique with pottery clays. The how-to directions for Skinner blends use a pasta machine to mix the colors. These are just small slab rollers, so I used my large one for the first test run and achieved amazing results. Thus began an intense period of experimenting with every combination of colors in every placement I could think of. They all produced amazing blends. Keeping the basic principles in mind, I easily adapted the process using a rolling pin between two slats, so you don't even need a slab roller.

Skinner Blend Basics

The colored clays are all made using the same white clay as a base, so there's no incompatibility with shrinkage when drying. Colors can be wedged into a ball of clay, or added to dry mix or dry trimmings and slaked down.

The basic, continuous Skinner blend template is shown in figure 1. It consists of two isosceles triangles of colored clay laid

down over a matching amount of white clay. There are no limits to the number of ways you can combine colors and the triangles don't have to be of equal size. You can add other colors in the middle or diagonally. For intense colors, use less white clay. You can also blend a single color with white to get a slow change of hue from dark to light. To see more examples, do a Google search for "Skinner blend."

For a continuous blend, feed the clay through the slab roller so that the short ends of the rectangle is parallel to the roller (*figure 2*). It helps to moisten the canvas or lightly spray the clay as the repeated rolling dries it out. Set your rollers so they will compress the clay to about half of its original thickness.

An alternate method is to roll the clay between two slats (*figure 3*). Slat control the width of the clay slab since it tends to spread sideways. Each roll should stretch the clay to be at least twice the length.

After every pass through the slab roller, fold the clay over with the open ends facing the rollers (*figure 4*). If you're using a rolling pin, fold the clay with the open ends facing you. Adjust the slats at any point to control the width you want. Repeat this process 18–20 times misting the clay or canvas occasionally to keep the slab supple.

During the process the colored slabs look discouraging (*figure 5*), but suddenly a beautiful blend emerges. Keep rolling until you like the resulting colors. That's it! The whole process takes about 15 minutes from start to finish with the slab roller and only a bit longer when you do it manually (*figure 6*).

Before using the sheets, number them and cut off a small sliver to test fire to cone 06 and verify the color results. If you wet this fired test sample, it reveals the cone 6 color. If the colors are too dark, you can lighten the hues by layering a sheet of white clay and rolling again until it blends in.

Creating with Blends

There are several ways of using blended color slabs. You can slice them horizontally to make use of the spectrum or vertically, using each color separately. You can use the colored sheets to build a whole object without turning it into any kind of pattern. The gradual fading between colors creates a very interesting surface choice. You can also slap the colors on top of each other and throw the resulting block.

You build images or patterns by using strips of different colored clays arranged so as to get a pattern. You create the pattern once, and then cut the block or loaf into slices. Depending on how you design the block, the images cut from it will either be identical or slightly different each time.

Colored clay blocks need to be sliced with a sharper wire than the normal cut-off wire. I make my own with the thin control line used by hobbyists to fly model airplanes. (Check out www.sigmf.com. Search for "control line accessories" under the aircraft accessories link.)

Of course, flowers and leaves are not the only block patterns you can make. Using these simple steps, any idea can be translated into any size block you want. My students have designed everything from fire-breathing dragons to quiet pastoral scenes by building on these basics.

Cut a slice across the spectrum then cut equally sized rectangles and apply a dark slip to one face (*figure 7*). Stack the pieces to create a block of subtle stripes. You could also leave out the slip or fold this sheet like an accordion for a softer, flowing look. This is a basic building block for creating patterns that look like feathers, fences, walls, buildings, or rooftops, and for checkered and herringbone patterns. After creating the blocks with graduated and alternating stripes, slice several blocks (*figure 8*) on an angle to create the leaf patterns (*figure 9*).

Making Colored Clay

You can purchase pre-colored clay but if you want more control over color and hues, I'd recommend mixing your own. You can use any clay body, but white clays firing at or above cone 6 provide vibrant color results. I prefer to mix the stains into wet clay bodies but some people mix dry stains into dry clay bodies before hydrating. The Mason Stain Company has a very informative web site with colors recommendations specifically for clay bodies. Check out: www.masoncolor.com/ceramic_stains.asp.

Though many other commercial stains will work well, you can buy small stain samples and test them first with each clay body before mixing larger, costly batches.

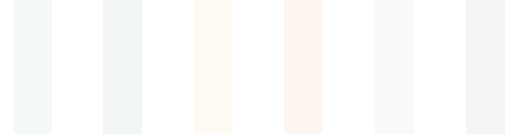
I always add a high percentage of colored stain to my clay because mixing is such a messy job and it's very easy to add white clay later to lighten the colors. It's also much easier to store 20 pounds of concentrated colored clays than 80 pounds of pastel-colored clays.

My favorite Mason stains are:

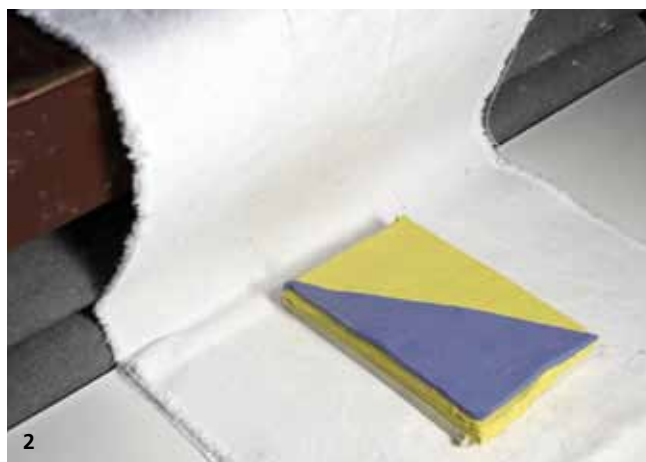
- MS 6020 Pink at 15–20%
- MS 6450 Yellow at 15–20%
- MS 6300 Blue at 6–8%
- MS 6242 Bermuda Green at 12–15%
- MS 6376 Robin's Egg Blue at 12–15%
- MS 6027 Tangerine at 12–15%
- MS 6304 Violet at 12–15%
- MS 6026 Lobster at 12–15%
- MS 6600 Black at 6–8%

I hear comments about how expensive stains are but consider that colors last a long time, especially if you're mixing in plain white clay. I keep colors stored in plastic bags for years with no ill effects. Another area of concern is safety. Be careful not to inhale the dry powder while mixing, so use a proper breathing mask. After mixing, the stains are safe to work with and fire. Some people choose to wear protective gloves.

I have experienced fluxing with some stain colors when they are used in a very concentrated form so you may have to prevent them from sticking to the kiln shelf. Sprinkle some alumina hydrate under them before firing to prevent sticking.



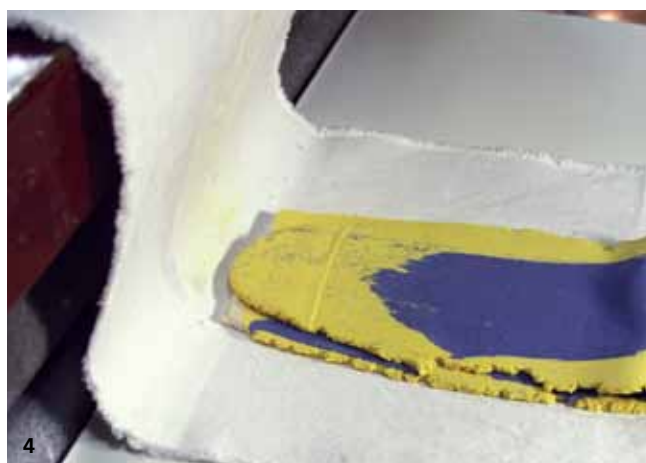
1 The template for creating a continuous Skinner blend, consists of two colored triangles on top of a white rectangle.



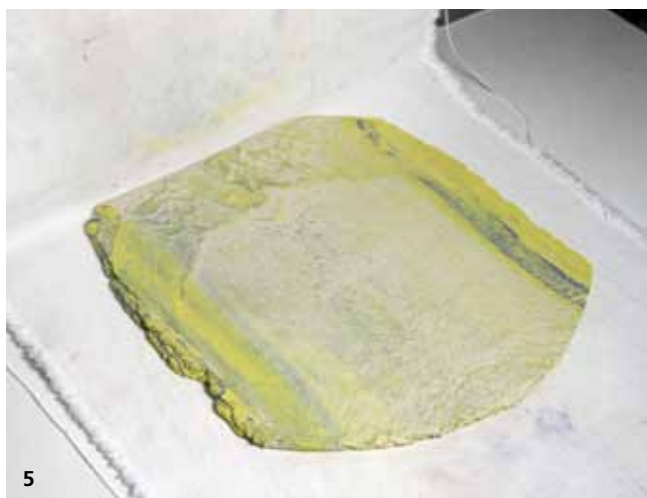
2 The clay is fed through the slab roller with one of the short sides of the rectangle parallel to the roller.



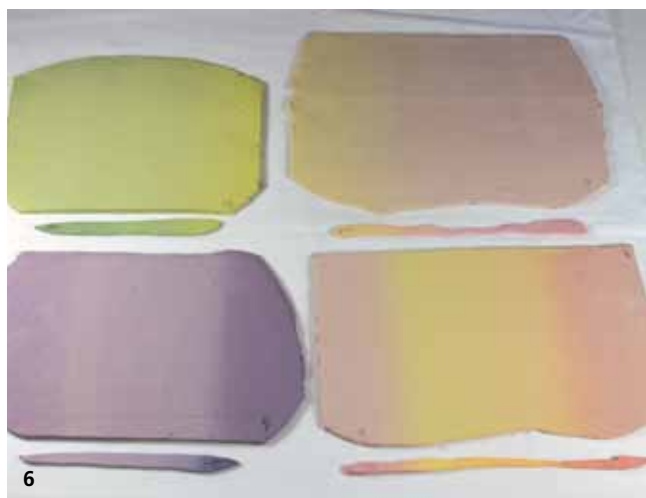
3 When using a rolling pin, set up measured slats along the long edges of the rectangle to control the width.



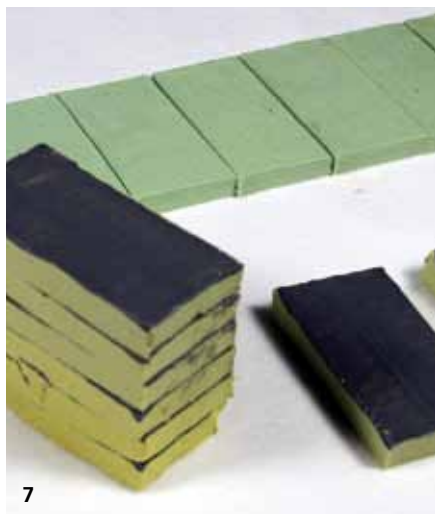
4 After each pass through the roller, fold the clay over so the narrower ends touch one another and face the roller.



5 During the process, the colored slabs look discouraging. The smooth blend appears after 18–20 passes through the roller.



6 Blended slabs from figure 1. Clockwise from top left: yellow and green; pink and orange; red, yellow, orange; pink and purple.



7 Cut a slice across the spectrum, then cut this into rectangles. Apply slip and stack the rectangles to create a block.



8 Select blocks with alternating patterns and graduated color on angles to create leaf patterns.



9 Slice blocks on an angle to create veined leaf patterns. Add a sliver of a contrasting color for the stem.



10 Cut vertical, single-colored slices of the slab and extrude them or roll them out to create sets of coils with gradually shifting colors.



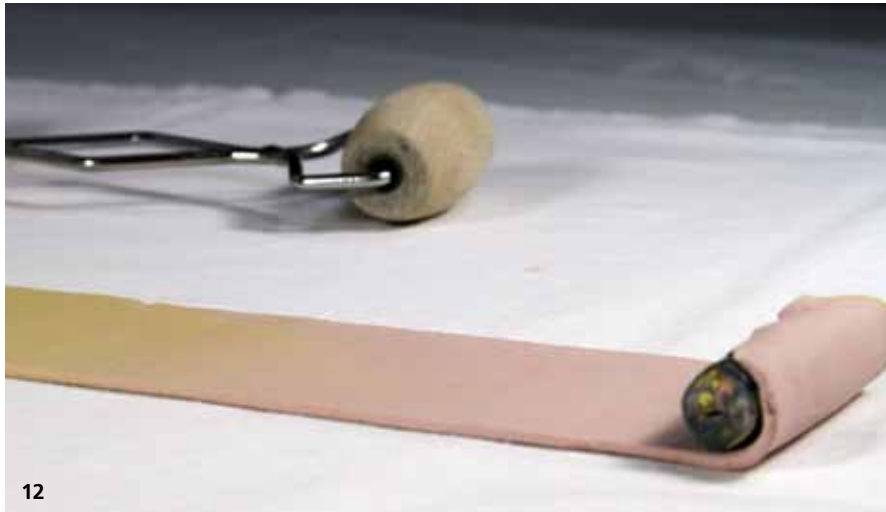
11 Create the flower centers by wrapping coils coated in a colored slip in a slip-coated slab.

There are several steps to build flowers from the center out to the petals. First, cut off the uneven ends of vertically sliced strips cut from the larger slabs and extrude them into coils (*figure 10*). Cover these coils with a colored slip, arrange them in a circular pile on a long, thin, colored slab that's also coated in a contrasting colored slip (*figure 11*), roll the slab around the coils, and join the long ends of the slab so that the coils are completely encircled. This becomes the center of the flowers. Roll a thicker, colored-clay slab around the center to create the body of a flower (*figure 12*). This slab is a continuous fade from one end to the other, which means that as you roll it around the center, the color gradually changes. When sliced, this creates a flower that has one color at the center and changes toward the edges of the petals.

Cut thin slices lengthwise along the roll to create individual petals. Insert a strip of white clay between each petal to preserve some distance between them and keep your shapes intact (*figure 13*).

The resulting patterned blocks can be used to create multiple pieces (*figure 14*). To create a piece using these canes, I slice them across the pattern into thin sheets or slabs and re-assemble the pieces into a larger shape (*figure 15*). I mist them, then gently roll over the pieces with a pony roller or rolling pin to connect them. The resulting thin, patterned slab is then placed in a slump mold, or formed into a cylinder shape and allowed to dry.

Colored blocks can also be used to decorate plain pots that are thrown or handbuilt. Best results occur when you use the matching clay body, but if you take care not to stretch them, you can



12

Roll a thicker slab that fades to different colors on each end around the flower center.



13

To create daisy-like petals, slice into the center and fill the space with a white slab.



14

Completed patterned blocks in flower and leaf shapes, ready to be sliced.



15

Arrange thin slices of the pattern blocks into a patterned slab to create a vessel form.

attach thin slices to wet clay with a similar firing temperature and shrinkage rate.

Once the pieces are dry, any specks, smudges, or streaks can be easily removed with a damp natural sponge. To avoid breakage, clean one surface then let the piece dry before cleaning the reverse surface. If the pieces are delicate, bisque fire them to cone 08–010. Then soak them in water before using black wet/dry silicon carbide sandpaper to remove any marks. No matter how smudged they appear, the pattern is still be intact below the surface. Do not dry sand any clay pieces without using a dust mask.

If you decide to throw a pot with the clay blend, it will initially look like a mess, but when it is time to trim the base you should be able to trim off the exterior surface layer to reveal a unique pat-

tern. Carve into the pattern for extra eye appeal. Don't crush or throw away your trimmings! They can be sprinkled across damp clay surfaces for a stunning, colored whirlwind impact.

I hope I have shown that only your imagination can limit what you create with colored clay blends. I encourage you to push your boundaries, try different ideas and share your results with others and with me. This process has rapidly revolutionized the polymer clay world and with your help, we can shake ours up, too.

Chris Campbell is a studio potter in Raleigh, North Carolina. She has worked with colored porcelain since 1990 and teaches colored clay workshops. She also lectures on the business aspects of building a career in pottery. Her website is <http://ccpottery.com>. She welcomes feedback at chris@ccpottery.com.

Cone 6
Tea Set
by
Sharon
Greenwood



Clay & Glazes by

Georgies

CERAMIC AND CLAY CO.

Visit www.georgies.com for
alternate firing schedules to
get cone 10 looks at cone 6.