

# how to make pottery



how to learn pottery techniques  
and enjoy working with clay



**Ringling College**  
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# How to Make Pottery

## How to Learn Pottery and Enjoy Working with Clay

When you put your hands into clay, there's a good chance you'll never want to stop. Just go by any ceramics class or community craft center and look at the people working with clay and you'll see one happy group of involved people of all ages enjoying the thrill of creating with their hands. Unlike a phone app, music download or video game, once you possess a pottery technique, it's yours for life.

### **Clay Slab Project: Plates** By Amanda Wilton-Green

A good first project to get the feel of clay is to make slab plates. This project uses simple tools but has endless possibilities. Using Chinet plates for molds, you can learn how to work with clay, make slabs and decorate pottery.

### **Pinch, Slab, and Coil Pot Project: Spherical Teapots** By Ron Korczynski

Ron was a pottery teacher for 32 years before retiring in 1995. Since then he's been perfecting the same techniques he taught students for many years—it's just a matter of practice. This teapot begins with two pinch pots put together then parts made from coils and slabs added to it. The possibilities are endless.

### **Throwing: A 3-Stage Approach** By Jake Allee

Teaching throwing is challenging even to the best of pottery instructors. Jake Allee approaches the topic with his students on several levels that include reading, visual diagrams, demonstrations and hands-on technique. Whether you want to teach throwing or you're wanting to learn on your own, Jake has some advice for you.

### **How to Glaze** By Annie Chrietberg

For a lot of people, glazing can be the party pooper for an otherwise extremely fun time. It doesn't have to be. When glazing is done right, the piece you've spent so much time on can really be outstanding. Annie Chrietberg offers 14 steps for successful glazing.

### **10 Hot Kiln Tips** by David L. Gamble

David conducts a lot of workshops for K-12 teachers and he answers many questions about problems related to firing pots. Here are 10 really great tips that will solve the majority of problems anyone can have with a kiln and you'll see that the maintenance tasks will keep your kiln running smoothly for years.



# Clay Slab Project: Plates

by Amanda Wilton-Green



Making slab plates is a great way to develop basic slab techniques, and using Chinet® plates for forms makes this an affordable class project. They also make perfect surfaces for exploring decorating techniques.

Making a set of ceramic plates can be fun for the beginning student, but is also easily adapted for the more-experienced student. This project presents a direct and fresh slab-forming approach resulting in plates that become great canvases for surface decoration. Materials are simple, inexpensive and readily available.

After only a few hours of work, students learn how to roll out a good, even slab, and can experience different stages of plastic clay and what the clay is capable of at each stage. They become familiar with simple slump molds and start to consider the form and function of their work. Most importantly, they learn how to handle clay in a direct and intentional way.

These plates become a wonderful surface for lessons on finishing, embellishing and glazing. I have expanded this lesson to include experiments with paper stencils and slip decoration, but that's just the beginning. Try underglaze design work and glazing methods with this lesson as well. When the project is completed, students have a set of plates to use in their homes or give as gifts.

## Forming Plates

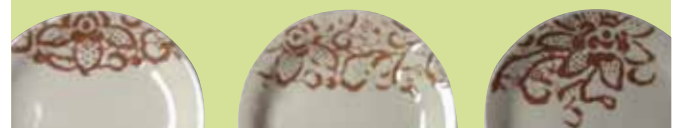
1 Roll out a slab to a desired thickness of  $\frac{1}{4}$  to  $\frac{1}{2}$  inch. When rolling out a slab, start by throwing it across the table in different directions until it is somewhere close to 3 inches thick. Roll the clay with the



## Equipment and Tools

- Large rolling pin
- Cut-off wire
- Sponge
- 25 lbs of clay with sand or grog to reduce warping
- Fettling knife or needle tool
- Chinet® paper plates.

Note: Chinet® plates do not have a plastic coating and absorb moisture from the clay. Avoid coated and plastic plates that will stick to the clay.





1

rolling pin, taking care not to roll over the edges. Roll two or three times on one side. If you are working on canvas, you'll notice that the clay stops stretching after the first few times because the clay holds onto the texture of the canvas. Carefully lift the slab creating as much surface area with your hand as possible, and leave the slab to stiffen to a soft leather-hard stage. The clay needs to be able to bend without cracking, but you don't want fingerprints to show as you manipulate your clay.

2 Choose the size of your plate. Chinet® brand has dinner, salad and dessert-sized plates as well as an oval platter. Place the plate upside down to use as a template for cutting the slab (*figure 1*). As you cut, keep your needle tool or fettling knife perpendicular to your work surface to create a square rim.



2

3 Remove excess clay and smooth out the rims. Slide your finger across the edge of the rim with firm and consistent pressure (*figure 2*). The sharp corner of the rim softens without flattening the edge. A damp sponge, chamois or a small piece of a produce bag also works. Stamp or sign the underside.

4 Flip the clay slab, smooth the top edge then place it into the paper plate, lining up the edges (*figure 3*). Experiment with pressing the clay into the paper plate with your hands or sandwiching your clay between two plates (*figure 4*). The clay will have a different character depending on your chosen method.



3

5 Allow the plates to dry to a firm leather-hard stage in the bottom paper plate. Remove the clay from the mold to check to see if the plates stack nicely and sit on a flat surface without rocking. Take a moment to look closely at the rim of each plate to do any final shaping they might need.

## Decorating Plates

These plates are adaptable to all sorts of decorative techniques at the leather-hard, greenware and bisque stages. The flat surface lends itself to painterly and expressive underglaze or glaze work. These slab plates are simple enough for very young students and satisfying for the adult student.

Slip decoration gives dimension to the plates and students draw on their own creative design ideas for the work. Textured dessert plates with slip inlay use found and inexpensive materials (see box) to create a design and a slip in contrasting color to further highlight the design. Paper stencils used with decorative slip can make bold, graphic borders or motifs for your set of plates (*figure 5*). With a little experimentation and practice, students come up with wonderful results.



4

## Making Sets

When we handbuild a set of plates, the student and experienced artist approaches each plate with a slightly different perspective. The experience of making the first



plate, bowl, mug or tile influences the next, as do things as simple as body position and energy levels. We're thoughtful and inconsistent creatures and we can use these characteristics to great benefit when done so with intention. A set of plates can be tied together with a theme, color, position of image, size or concept. Because we're used to seeing sets coming from a factory, the default definition in our minds can be limited to identical objects. This lesson is a great way to discuss the many possibilities for sets in functional ceramics and can demonstrate the benefits of using handbuilding techniques.

## Textured Dessert Plates

Roll out ¼- to ½-inch-thick slabs. Before cutting out the plate, place textured material along one side of the clay slab and gently roll into the clay. Once the material is flush with the top of the clay, peel it away. Clay is great for picking up the most delicate details and is quite beautiful at this stage.

With texture along one side of the slab, place the paper plate templates so that the location of the design will be pleasing on a plate. Remove excess clay and smooth the rims of the plates, working on the top edge and then flipping the clay to finish the bottom edge of the rim. Sandwich the clay between two paper plates and press the clay into the bottom corners of the lower plate. Remove the top plate and paint a generous amount of contrasting slip over the textured area. Leave the clay in the bottom paper plate and let dry until it is a very stiff leather hard. The amount of time varies depending on climate inside the studio. At this stage, use a metal rib to scrape away the top layer of colored slip leaving behind only what is inlaid into the textured areas.

## Paper Stencils

Use paper stencils on leather hard clay after clay is placed into the paper plate mold. I encourage beginning students to make twice as many plates that they hope to end up



## Interesting Texture Materials

### Texture Ideas

**Gently roll the following into your plate with a rolling pin:**

- Corrugated Cardboard
- Bubble wrap
- Lace remnants
- Mesh produce bags

### Stamping Ideas

**The following items can be pressed like stamps into the clay but don't do well under a rolling pin:**

- Small plastic toys such as animals
- Beaded necklaces (I like the bathtub drain chain, but be careful not to go too deep with this or it can act like a perforation and give your plate a long crack.)

with to keep them from overworking any one plate. Besides, they learn so much from the results of the larger sample.

Each paper stencil can easily be used two times, and with care, up to four times. Keep a copy of the original design. I recommend students prepare by cutting as many stencils as required before beginning the slip work. Trim stencils so that there is about two inches of paper around design. Soak paper in water until wet but not soggy and then set onto paper towel to remove excess moisture. Position stencil and press down with a damp sponge. Paint slip over design then remove paper stencil. If the stencil is too dry to adhere to the next plate, repeat soaking. Sometimes the stencil can be directly transferred to the next plate and pressed with the sponge. ●

# Pinch, Slab and Coil Project: Handbuilt Spherical Teapots

by Ron Korczynski



Spherical teapot, 9 in. (23 cm) in height, underglaze decoration with clear overglaze fired to cone 04, by Ron Korczynski. The teapot form easily lends itself to a wide range of creative expression, and handbuilding a round teapot frees the clay artist from the symmetrical mechanized look of the wheel.

**T**ea pots are one of the greatest challenges for any studio potter. Many elements go into their production and all the parts—the body, lid, handle and spout—need to fit together into a cohesive whole. For centuries, teapots have been produced in myriad ways and forms, and like many potters, I initially began making teapots on the wheel. But throwing and putting the parts together was a challenge for me because the forms were too mechanical so I began to experiment with handbuilding. Since I've done a lot of handbuilding using hump molds, this seemed the logical path to take. While the process here uses a spherical form, you'll soon recognize the endless possibilities with other shapes.

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*“I cannot explain my enjoyment of clay. It is difficult to put into words the feel of the clay in my hands, the growth of a pot as it changes from a shapeless mass into a vessel, the look of the dry glazes as I decorate, the touch and visual experience of the pots as they come from the kiln.”*

Ron Korczynski

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## Getting Started

Each teapot begins with a slab draped over a plaster hump mold. I make these round plaster hump molds by taking a Styrofoam ball and cutting it in half. Styrofoam spheres are available in a variety of sizes from craft supply stores, and you'll need a 6-inch ball for a modest-sized teapot. Other forms can also work and I use the blue extruded Styrofoam board found at home centers to build up and carve molds. Once the shape is finalized, I glue it to a piece of wood or tempered hardboard that's been cut to shape (figure 1). **Tip:** You can finish the mold by propping it up and pouring plaster over the top. This gives you a thin, durable, absorbent layer that can be smoothed out when dry and makes a great lightweight mold.

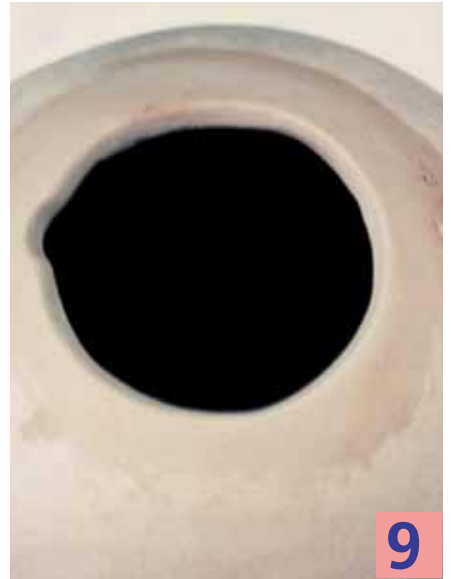
## The Sphere

Roll out a slab that's about  $\frac{1}{4}$  to  $\frac{5}{16}$  inches thick. Apply toilet paper to the mold as a release and place the slab over the mold.

Trim the bottom, remove and repeat for the second hemisphere (figure 2). Set the hemispheres aside and allow them to dry to the leather-hard stage.

Roll out a coil and attach it to the edge of one hemisphere (figure 3), then attach the other hemisphere using your finger or tool to work the seam (figure 4).

Use a Surform tool to refine the shape (figure 5). Since I do a lot of painting on my surfaces, I use a metal rib to smooth the sphere (figure 6), but you can add different textures at this stage.







*All the parts of a teapot—body, lid, handle, foot and spout—need to fit together into a cohesive whole.*



Many teapots can be made using this technique, and the handbuilt sphere can form the basis for a variety of vessels or sculptures. The possibilities are endless.

## Base and Lid

To create a base, one method I like is to use a triangular trimming tool to cut a strip from a block of clay (figure 7). With the sphere resting on an empty plastic container, attach the base and add decorative elements according to your style (figure 8). Of course, design opportunities abound here but bear in mind that all parts on a teapot work to form the whole work.

For the lid, cut a round opening in the top of the sphere and set it aside. In order to have the lid fit only one way, make a small notch in the opening (figure 9). Place toilet paper around the edge of the opening as a separator. To construct the lid, first place a small ball of clay in the notch (figure 10), then add a coil of soft clay to fit into the lid opening (figure 11) so it slightly overlaps the open-

ing. Take the clay piece you removed to make the opening and attach it to the coil (figure 12). Flip the lid over and add a ball of clay to the underside of the lid (figure 13). This will add some weight and balance to the lid to help hold it in place when pouring tea.

## Spout and Handle

To form the spout, flatten a cone of clay (figure 14) and form a spout around a brush handle (figure 15). Trim the spout and attach it along with decorative elements to the teapot (figure 16). To create the handle, I create two “dog bone” shapes and flatten them, leaving some thickness at each end (figure 17). Assemble the handle and add a decorative element if desired. Add a handle to the lid following the same style (figure 18). ●

# Throwing: A Three-Stage Approach

by Jake Allee

While conducting a workshop at the “Clay on the Wall” symposium at Texas Tech, someone asked the question, “How do you approach teaching people to throw on the wheel?” This is a good question and it’s something I’ve thought about often. I’ve always held that all people have a mechanical intelligence related to manual dexterity as we all have cognitive intelligence. People have different aptitudes that translate into or affect their manual dexterity.

Over the last several years, I’ve focused my teaching efforts on catering to all of these dispositions and to different learning styles with the goal of helping students learn and develop good habits. After all, learning to throw on the wheel is about developing habits and you want the student to develop good habits first. I personally know what it’s like to feel the frustration of having to relearn something after developing a bad habit, because I’m learn things slowly to begin with. The following should help you get quicker results from all your students.

Many educational workshops use a lot of buzz words and philosophical concepts to identify and measure learning styles, but what a clay instructor needs is a simple “nuts and bolts” method for attacking the problem. I resolved to strip down the basic learning methods into three categories and attack them individually in three matching stages through my teaching:

Stage 1. Readings and visual diagrams  
Stage 2. Practical demonstration and use of technique  
Stage 3. Hands-on experience

Obviously hands-on experience is the part we quite often throw our students at first, and we answer questions after mistakes are made. However, reinforcement of information introduced first through readings and diagrams then through practical demos is the best way to see results at stage 3. Using the three-stage process calls upon the student to assimilate information in a manner that they don’t normally associate with art making, yet are familiar with through other subjects. As a teacher, prioritizing these stages in learning a process in order from 1 to 3 is key to a student’s success, because they have the “blinders” on and will always prioritize them in the opposite direction, from 3 to 1 due to honest

excitement and raw energy to learn! I believe when the students are called upon to refer to information they’ve learned in stages 1 and 2 while engaging in stage 3, they get a phenomenon educators call “completing the circle.” When you complete the circle you are being as efficient as possible with your efforts toward teaching and directing the students to do the same with the act of learning.

## Stage 1: Readings and Visual Diagrams

This first category of learning methods, and the first stage in teaching throwing, is often ignored by the teacher because it takes work up front, and as educators we’re already buried in paperwork! However, the extra time used for preparation pays off and the students will be quicker to meet you half way.

A worksheet designed to address all the critical points associated with habit forming for wheel throwing technique helps. I always begin by asking the students to read the worksheet through and I then present them with several questions to make sure they have read it. After that, I go over the content of the worksheet again, re-phrasing it with words that come more naturally.

Any worksheet that addresses frequently asked questions can be used as a reference point by the students and ultimately make your job easier. A worksheet never takes the place of a verbal explanation from the instructor or a practical demonstration, but it certainly gives the student something to think about when it’s placed in their hands, even if they’ve walked into the classroom late. The worksheet always reinforces stages 2 and 3. Flying solo with a worksheet for one class might make a student think about showing up on time. Revisiting the handout prior to practical demonstration at the beginning of the next class will eliminate your feelings of guilt and give the late student a chance for redemption.

## Stage 2: Practical Demonstration

After everyone has read the worksheet and I reinforce and explain it verbally, I move to stage 2. The students watch the practical demonstration while reference to the worksheet throughout the process. I slow way down and ask the students how I should be executing the tech-

nique according to the worksheet. I demonstrate all of the steps listed to further reinforce the information. At this time I also talk about some of the “tricks” in my personal approach for success.

If I make a mistake in the process while demonstrating, we discuss what happened. I encourage the students to ask the following questions. WHY did the mistake happen? WHAT should have been done differently? HOW can the mistake be corrected? This shows students how to learn from the inevitable mistakes. They also refer to this experience of watching a demonstration, and the troubleshooting that occurred, when working on their own pieces, so it helps and influences them as they form their own habits. Lastly, it also puts them at ease with the expert imparting the knowledge.

The first piece I make for a demo is always destroyed at the end; this takes away the preciousness of the object created. I then take the opportunity to give my short talk on how each person in the class dictates what is considered their first piece on the wheel. Will it be the piece that becomes an ashtray, or will it be the piece that is kept after they understand the control required to make a thin wall and keep the piece centered? The viewer may never know if the maker’s first piece was made on the very first day or at the end of the first year of practice.

## Stage 3: Hands-on Experience

When I finally make it to Stage #3, everyone is ready to get started. I ask for one more exercise of patience on the student’s part. Everyone goes through the steps of centering and opening simultaneously and no one moves to the next step until

everyone is ready. Once everyone gets to the point of pulling up on the cylinder, they are all cut loose and begin to work on their own. At this point I walk around and address all of the students one-on-one, giving suggestions and helping with the challenges they encounter. The whole process takes me about an hour to go through from start to finish. I always start the next class with a review through practical demonstration and check that everyone has their worksheet with them for reference.

This approach may not work for all teachers, but the idea is to teach from as many angles as possible and use each angle to reference the other. Think about adapting this method to your particular way of

teaching. Look at the effort Val Cushing has put into point #1—the achievement of his students speaks of the value of his efforts. To the students reading this, please use this information to pull knowledge from your teacher in a way that best fits your learning style, I’m sure he or she will direct you to a good resource even if there’s no worksheet available. Remember, the classroom environment is a 50%–50% situation with regards to effort, requiring equal amounts from both student and teacher. Realizing this helps speed everyone to what really counts, THE CONTENT OF THE WORK. Technique is only the path to content and work ethic will drive you down that path! GOOD LUCK! ■

## Creating a Teaching Worksheet for Ceramics

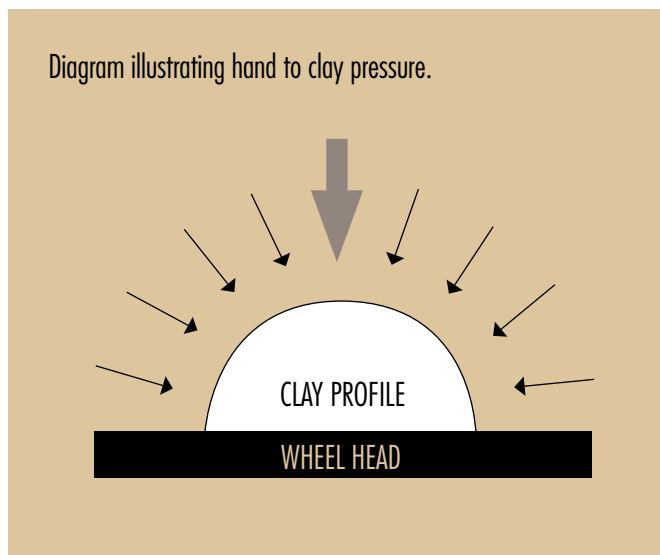
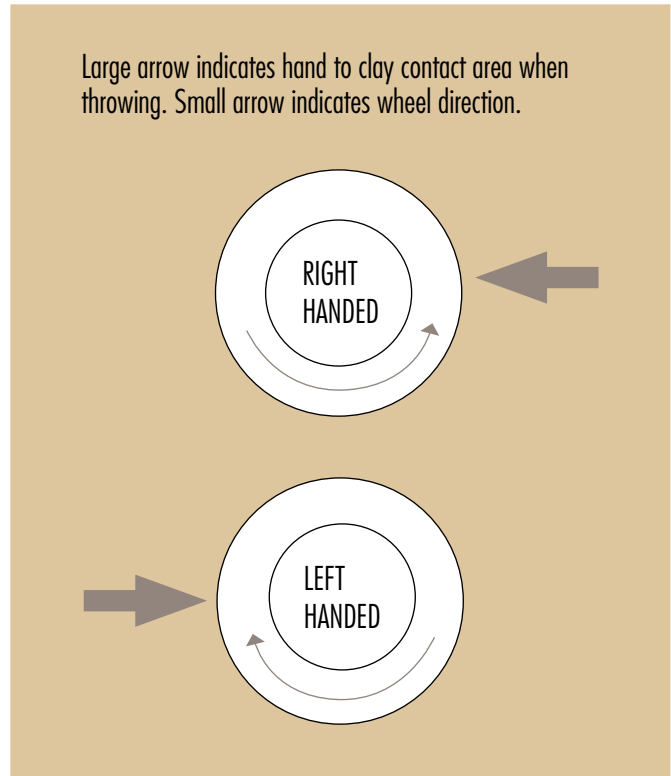
- #1** Identify the basic steps in the technical process. Double check the descriptive language used to convey these steps.
- #2** Develop drawings or high-contrast photographs as visual examples to these steps. All diagrams should be clearly labeled and the images should photo copy well.
- #3** Identify and address frequently asked questions.
- #4** Leave the “tricks” out and let that be a point of interest with the practical demonstration.

# Throwing on the Wheel

by Jake Allee

## TIPS FOR SUCCESS

- ▶ Always apply and release pressure to the clay slowly.
- ▶ Never allow water to collect in the bottom of the piece.
- ▶ Slow the wheel down in each step of the process.
- ▶ Be persistent in your efforts.



## CENTERING THE CLAY

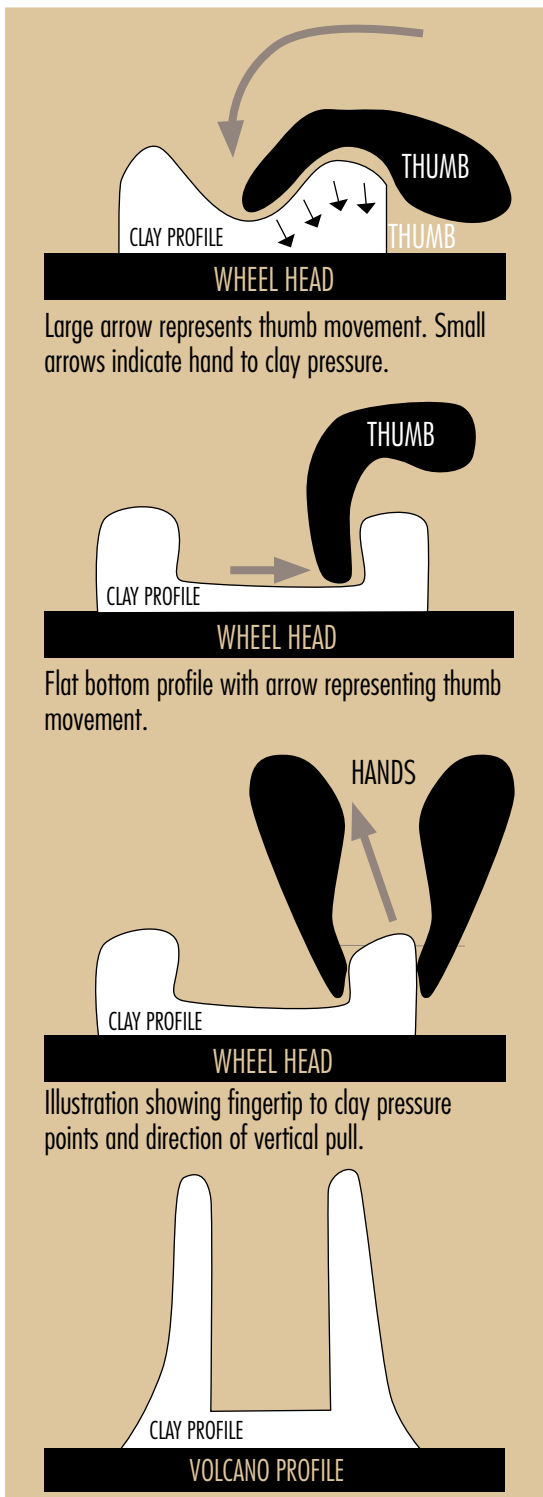
- ▶ Start with a well wedged ball of clay that's no larger than the size of your hands.
- ▶ Anchor your elbows to your knees for stability.
- ▶ Wet your hands and the clay.
- ▶ Slowly apply downward pressure equally to all sides of the clay until no movement exists within the mass.
- ▶ When the clay is "centered," it will be spinning while your hands remain still.
- ▶ Once the clay is centered, relax and slowly pull your hands away.

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## OPENING UP THE CLAY

- ▶ Place the tip of your thumb in the center of the clay mass.
- ▶ Slowly roll your thumb into the center of the clay maintaining pressure on the clay profile.
- ▶ Stop ½ inch from the wheel head.
- ▶ To create a flat bottom, use the same hand position and pull straight back toward yourself.
- ▶ Any movement causing the piece to go out of "center" is reflected in the rest of the piece.



## MAKING A PULL

- ▶ From this point on, manipulate the piece only at the 3 o'clock position relative to the wheel head (9 o'clock if left handed).
- ▶ Slowly apply and release pressure.
- ▶ Always use your fingertips when making a vertical pull and slow the wheel down.
- ▶ Position your inside finger slightly above the outside finger and apply pressure with the outside finger slowly moving your hands upward.
- ▶ When making a vertical pull, pull the clay inward to create the volcano shape.
- ▶ Repeat the pulling process until the wall is uniform in thickness from top to bottom.



# How to Glaze

by Annie Chrietberg



Photos of finished pieces by Harrison Evans.

**“Auntie Myrtle: A Covered Dish.”** Glazing complicated pieces requires pouring, dipping, and brushing of glazes. Practicing with various techniques ensures greater success with each piece you complete.

Glazing, for a lot of people, is the bane of their ceramic lives. While there’s no specific glazing system that fits everyone’s needs and preferences, the more information you have allows you more options when you get into a glazing corner. My system for glazing evolved with my own body of work, and as the work changes, I draw on various aspects of it to suit the particulars of the pieces in front of me.

For complex forms consisting of thrown and tex-

tured elements, I use a combination of pouring, dipping and brushing to get the color where I want it. Dipping is the easiest way to ensure an even application, and pouring, with a little practice, is the next. Brushing takes more practice, time and attention, and I only use it when the first two methods are not options for a tricky place on a pot.

The two troublemakers involved with glaze application are water and gravity. When a bisque pot becomes



Process photos by Jonathan Kaplan.



too saturated with water, it won't accept glaze correctly, so use the least amount of water possible when glazing, including when you are making corrections. And as for gravity, I doubt there's anyone who hasn't experienced the wayward drip of one glaze flowing toward the earth across the perfect application of the previous glaze.

## Tips for Success

- Keep bisqueware clean. Lotions, or even the oils from your hands, can create resist spots where glaze adheres unevenly or not at all. Throughout all phases of the glazing process, including loading and unloading the kiln, handle bisqueware with a clean pair of disposable gloves (*figure 1*). If you think your bisqueware has been compromised—splashed with something, covered with grime, or maybe handled by a visitor—bisque it again rather than risk a crawling glaze.
- Remove all dust before glazing including bisque dust, studio dust and even household or street dust. Use an air compressor for foolproof results, but work outside or in a well-ventilated area away from your primary workspace, as bisque dust is extremely abrasive to your lungs (*figure 2*).
- Use silicon carbide paper to remove any rough spots you missed before bisque firing. Place your work on a piece of foam to prevent chipping. After sanding, wipe with a damp sponge to remove all traces of sanding dust (*figure 3*).
- Use a damp sponge instead of rinsing, which should be kept to a minimum. Wring the sponge thoroughly and rotate it so each area is only used once. I tend to use half a dozen or so of those orange round synthetic sponges during any given glazing session (*figure 4*).
- Glazes must be well mixed. I use an electric drill with a Jiffy Mixer attached (*figure 5*). If there is dry glaze caked on the sides of the bucket, sieve the glaze, then return it to a clean bucket.
- Glaze all the interiors of your pots first by pouring the glaze in, then rolling it around for complete coverage. For complex pieces requiring a number of glazing steps, glaze the insides the day before to give you a drier surface to work with, especially for brushing (*figure 6*).
- When removing unwanted glaze, scrape off as much of it as you can with a dental tool or a similar small metal scraper to keep a sharp line. A damp sponge removes the remaining glaze with a few strokes, keeping water usage to a minimum (*figure 7*).
- Use a stiff brush to help clean glaze drips out of texture (*figure 8*).
- For dipping glazes, select an appropriately sized container for the work at hand. I have lots of different sizes of shallow bowls that are perfect for dipping the sides of my pieces. Wide shallow bowls allow me to see what I'm doing, so I even use them for smaller things that fit into the glaze bucket (*figure 9*).



## Brushes

I use sumi brushes, which have long bristles that come to a point, but in the past, I have also used hake and multi-stemmed hake brushes for large areas. Experiment with all the long, springy-bristled brushes. Mop brushes might work for you, but don't buy expensive water-color brushes. Applying glaze is a cruder application than watercolor, and an expensive, fine water-color brush won't work as well for a glaze as a cheap hake from the ceramic supply store. A brush with long, springy bristles that come to a point is best. Successful brushing not only relies on technique of application, but also the glazes you're using and the temperature you're firing to. Some glazes lend themselves well to brushing, while others are more finicky. Make wide tiles representative of your surfaces and use them to test how well your glazes take to brushing.

- When you can't dip or pour, it's time for brushing. Watch your bisque as you brush—glaze is shiny and wet when first applied, then becomes matt as the bisque absorbs the water. If you recoat too soon over a damp coat, you'll move the foundation layer rather than imparting a second coat (*figure 10*).
- Consider gravity when brushing and hold the pot both to encourage the glaze to go where you want it to and to keep it from running where you don't want it (*figure 11*).
- If a drip flows onto a previously glazed surface, stop, set the pot down and wait. Resist the urge to wipe the drip with a sponge. Let the drip dry, then carefully scrape it off with a dental tool or metal rib. Use a

small compact brush to wipe away glaze in areas you can't reach with a sponge (*figure 12*).

- Don't brush glaze from the big glaze bucket. Pour a small amount into a cup, then briskly stir it occasionally to ensure that it stays properly mixed. Keep a large, damp sponge nearby to keep the brush handle clean. Stray drips often start with a handle full of glaze (*figure 13*).

If you're glazing pots that don't have a defined foot, push them across a piece of 220-grit silicon carbide sandpaper. The sandpaper removes some of the glaze from the contact areas, indicating where you need to wipe off the remaining glaze (*figure 14*). ●



# 10 Hot Kiln Tips

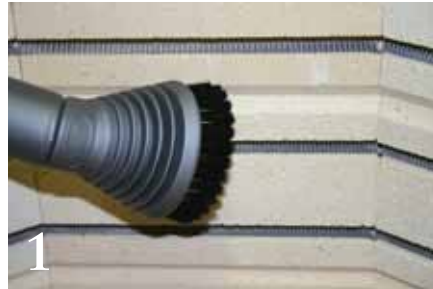
by David L. Gamble

I conduct a lot of workshops for K–12 teachers around the country every year and I'm thrilled about the enthusiasm educators have for teaching ceramics to kids. Throughout these workshops I answer many questions and hear a lot of stories on the subject of firing, especially of electric kilns.

There are two main reasons for firing clay, and in most cases two different firings are required. One is to prepare pieces for glazing by firing what is called a *bisque*. In this firing, the heat from the kiln changes the molecular structure of the clay and hardens it so it will no longer break down in water to its original moist, pliable form. This also makes pieces less fragile, but still porous enough to absorb water so that when wet glaze is applied, it will stick to the surface. The second firing is to melt and fuse any applied glaze to the surface and for higher temperature firings, this firing further strengthens the pots.

## Ten Tips for Successful Firing

**1** Before you fire. When installing your kiln, make sure it's at least 18 inches away from any wall. Vacuum the interior of the kiln, especially the element grooves (*figure 1*), about every 20 firings, and after every firing when a piece blows up in the kiln. Inspect hinges and handles for wear (*figure 2*). Check the thermocouple(s), and replace if necessary (*figure 3*). Every six months, unplug the kiln (if your kiln has a plug) and inspect the prongs as well as the insulation (*figure 4*). Brown or



**1** Vacuum the interior of the kiln, especially the element grooves.



**2** Inspect hinges and lid handles for wear. Tighten loose screws or pins.

black discoloration indicates a worn plug or loose wires and a potential fire hazard. Keep all flammable, combustible and meltable materials (cardboard, wareboards, newspaper, fabric, vacuum hoses, plastic, etc.,) away from the sides and top of the kiln. These areas get extremely hot.

**2** Protect your shelves. Kiln wash protects your shelves from glaze



**3** Check the thermocouple(s), for excessive oxidation.



**4** Unplug the kiln and inspect the prongs and insulation.



**5** Inspect kiln shelves and reapply kiln wash to any bare spots before firing.

drips. Inspect shelves prior to firing and recoat any bare spots or recently cleaned and scraped shelves as needed (*figure 5*). Remove any loose or chipped kiln wash that make flake onto pots during the firing. Store unused shelves in a safe and low-traffic area.

**3** Always use cones. Pyrometric cones are formulated from



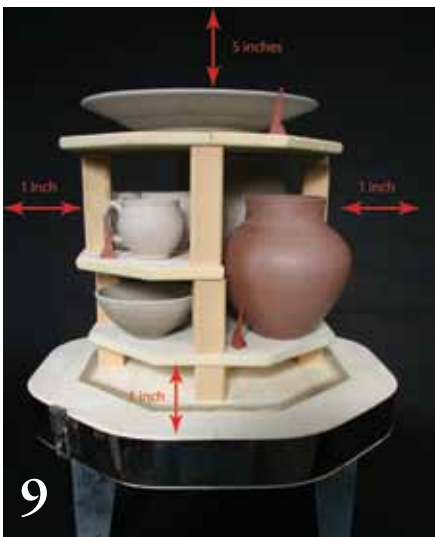
**6** Remove burrs using a damp sponge or drywall sanding screen before the bisque firing.



**7** A pot that feels cool to the touch still has moisture in it and needs to be preheated before firing.



**8** Sponge off any glaze within ¼ inch of the bottom of the foot.



**9** Stagger the shelves and place taller pots in the middle of the kiln to promote better heat penetration. Allow 5 inches of clearance when placing large flat work on the top shelf.

ceramic materials including clay, oxides, feldspars, and frits, and are designed to bend at specific time/temperature combinations to give you an accurate reading on the heat-work created in your kiln. Cones measure the relationship of temperature absorbed by the ware over time. **Tip:** Use cones even if you are using an automatic kiln controller. Cones verify the accuracy of the controller.

**4 Clean up greenware.** Signatures and decorations leave burrs that must be removed using a damp sponge while leather hard, or drywall sanding screen for drier work, before the bisque firing (figure 6). Once fired, the only way to remove these is by grinding with a Dremel tool, or sanding with wet/dry silicon carbide sandpaper.

**5 Handle greenware with care.** Bone dry greenware is fragile—more fragile than when it's leather hard. Never pick up pieces by any appendage or handle.

**6 Fire dry pots.** To see if a pot is dry, touch the pot to your cheek (figure 7). If it is cold or damp, there is still moisture in it and you will need to preheat the kiln to 180°F and leave it at that temperature and vented until all moisture is gone. Water boils at 212°F (100°C), and that's the temperature where there's danger of blowing up pieces. If the moisture is not driven out and the temperature rises to water boiling levels, the rapid expansion of the steam that's created blows out the walls of your piece.

**7 Wipe your feet.** Any glaze that touches the shelf during a firing sticks to it. Carefully sponge off any glaze within ¼ inch of the bottom of the foot. For pots with thick or runny glazes, clean off a bit higher than that. Do not rely on the kiln wash to save the pot or the shelf from being damaged by glaze drips (figure 8).

**8 Loading greenware or glaze-ware.** Electric kilns heat from the outside walls, where the elements are located, in towards the center, so stagger the shelves and place taller pots in the middle of the stack to promote better heat penetration to the middle of the kiln. Greenware pieces can touch and can be stacked in some cases, but I prefer to leave space between them for even heat distribution. When placing a large flat piece on the top shelf, allow approximately 5 inches of clearance to the top. Extra clearance allows for heat from the sides of the kiln to travel up and over, reaching the middle of the piece so that all areas heat evenly. If wide pieces are heated unevenly, the expansion rate of the side may be considerably different from that of the center of the piece, which will cause it to crack. In all firings, keep a the edge of the stack at least 1 inch from sides of the kiln (figure 9).

**9 Bisque fire slowly.** Clay contains organic material that needs time to burn out. If you raise the temperature of the kiln too fast, gases will become trapped in the clay body. Organic materials burn off between 572°F (300°C) and 1472°F (800°C). Also, if not completely burnt out in the bisque, organics may give you trouble in the glaze firing as it escapes as gas, pushing through the glaze and creating pin holing, which can mar the glaze surface.

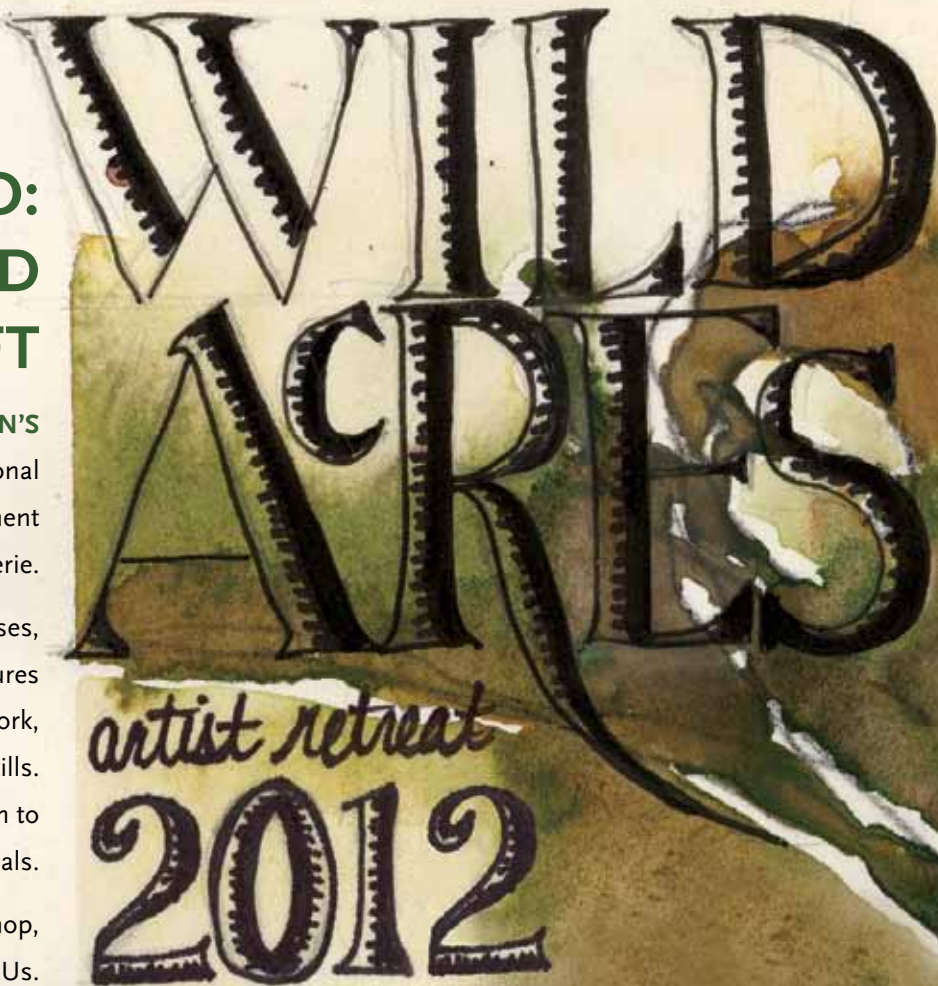
**10 Keep records.** Keep a firing record of firing times (lengths), the cones you used and the result of their melt (draw a quick sketch of how they looked, or note whether the target cone was at 1, 3 or 5 o'clock for example), and record the number of firings in a particular kiln. These records can give you indications on element wear (e.g., if firings take longer than usual) and future maintenance that may be needed. ■

# CLAY STUDIO: TAKING IT BEYOND THE CRAFT

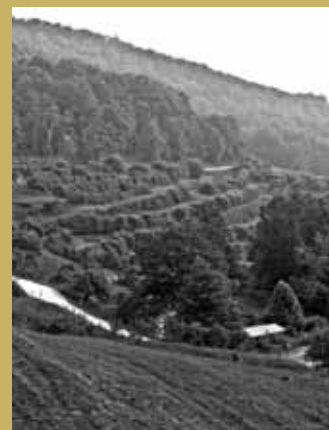
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