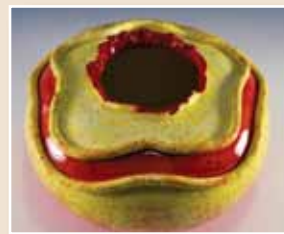
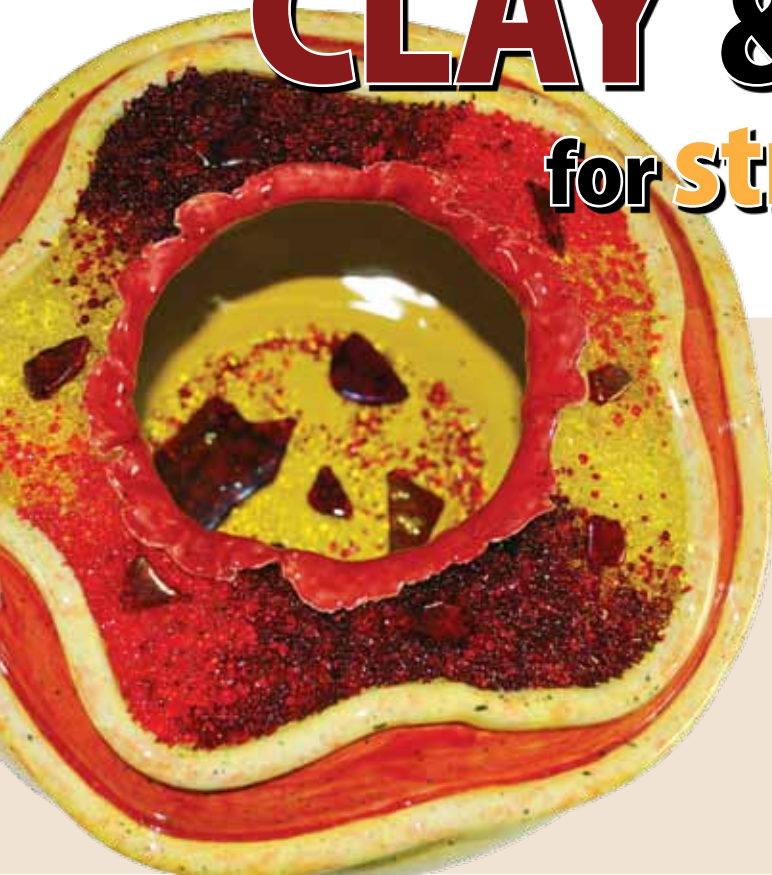


# Combine CLAY & GLASS for striking results

By Michael Harbridge



After firing this clay-puzzled shape, I applied Mayco SC-6 Sunkissed to the top two thirds using a soft fan and SC-75 Orange-A-Peel to the bottom half using a sea-wool sponge, allowing the Sunkissed and Orange-A-Peel to overlap

and working some of both colors wet into wet so they look like a gradual blend, rather than a straight line. Three coats of SC-74 Hot Tamale went into the stripe area and the interior edge. I rolled clear glaze in the interior; it wasn't required on the exterior. After stiling and firing to cone 06, I spooned yellow, orange, and red medium glass frit into the top section, then stilted and fired it again to around 1,400 F.

Whether you work with ceramic clay or with glass, you'll find some crossover opportunities within this article. I've done many articles and workshops with clay and glass combinations, and I continue to experiment and push the limits. Along the way, I've found many things that work, along with methods that didn't meet my expectations. Within this article you'll see some of the things that didn't work along with things that did. But the only way to discover the next great method is to try out new ideas.

When I began experimenting with this method, I built clay shapes and then carved recessed areas in them where glass could be placed. However, this technique resulted in thin areas on the shapes, which led to uneven clay drying, cracking, and many other issues. So I had to think a little harder. Then it came to

me — instead, I'd build up the area around the desired glass placement spots. Now it seems so obvious.

The cool thing about this method is that it can be done with hand-built ware, thrown creations, cast pieces, and clay puzzled shapes. Coils can be made by hand or with hand extruders. Glass can be fired to the higher glaze temperatures for flat designs or cooler for textured tack-fused formations. Dichroic glass can also be added at the cooler temperatures with outstanding results!

The first part of this technique covers creating a basic shape using a clay-puzzling or slip-casting mold. You can also hand-build or throw a shape if you choose. You'd need a pottery wheel for throwing, and appropriate clay tools for hand-building, depending on whether you are working with clay slabs, pinch pots, or coil-built shapes. You can also use slump and drape molds as forms. The possibilities are endless!

Karen Wise has written a series of articles on wheel throwing for *Fired Arts & Crafts*, and there are several articles detailing hand-building methods for clay shapes. Visit [www.firedartsandcrafts.com](http://www.firedartsandcrafts.com), click on the Lesson Plans tab, and look under "Clay" to see some of these options.

## Objectives

- Work with clay to form shapes
- Create cavities in clay shapes for glass
- Combine glass and ceramics for decorative ware

## Materials

### Clay & Supplies by Continental Clay

Low-fire moist white clay

Project boards

### Brushes by Royal & Langnickel

R2845-6 Aqualon Ultimate glaze

R2006-4 Sea wool sponge

### Colors by Mayco

See specific colors by finished samples

### Miscellaneous

KI200 Hand extruder by ClayPuzzling

Glass frit in assorted colors

Glass chips

Assorted stilts

Spoon

Slip

Whatever method you use to create your shape, the main thing to keep in mind is that you need to incorporate a fairly flat area for the glass. It's really not possible for glass to adhere to multiple sides of a vertical piece unless you embed the glass into the glaze. Incredible flowing effects around designs and on vertical designs can be achieved when glass is fired with the glaze. In order to tack fuse or puddle glass in designs, the glass needs to be on a flat surface so it won't flow out. Glass will soften and move at cooler temperatures than clay and glaze.

## Create a Shape — Puzzling

### Puzzling Materials by Clay Puzzling

BP301 Short Wide Vase

BP391 Large Squat Vase

BP 392 Round Flattened Vase

BP939 Large Square Vase

BP505 Large Wide Vase

PT-2 Press tool with light

RSET-POT1 Basic tool set

**Step 1:** Open the mold shape and dust out the interiors of both parts. Press random or formed shapes of moist clay into each cavity. If working with coils, use a hand extruder to make the coils and press them into the mold halves. Place the coils in figure eights so they overlap one another. Avoid leaving spaces or openings larger than the size of your thumb. Large

openings can compromise the stability of the shape. You can also combine solid areas with coils and open designs. Do not go past the edges of the molds.

**Step 2:** Firmly press the clay inside the mold halves. Use a sponge or cloth to prevent leaving fingerprints or marks where your nails cut into the clay. On solid areas, you can run your fingers over clay pieces or coils to mash the clay together. Don't press too hard on the coils, or they will get too thin.

**Step 3:** On areas where the clay is solid, place a solid coil along the edge of one mold half. This clay will be used to bond the two halves. Do not place it above the top edge of the mold. Working with one continuous coil of clay, create loops about an inch high (going up and down) along the same half of the mold, only in the areas where coils are present. Try not to have too many breaks in the coils, since this will result in less strength of the finished clay shape. Do not go higher than an inch or they will be too top-heavy for the next step. Bend the loops inward so that when the mold halves are placed together, the coils won't get caught.

**Step 4:** Place the mold half with the coil and/or loops facing upwards on your work surface. Pick up the other mold half and wrap your fingers around the edges slightly, so that as you turn the mold over to place it on top of the first half, the clay inside the mold won't fall out. As you line up and place the mold halves together, pull your fingers out. Wrap the mold tightly with the Velcro strap.

**Step 5:** Use the press tool with the light to reach inside the mold and press the coil loops down to attach the two halves together. Squish the coils onto solid areas to attach and fill in any gaps.

**Step 6:** Place the mold on its side, remove the Velcro strap, and gently pull the top mold half away. Feel the bottom of the ware to determine if the shape will be able to stand on its own if taken out immediately or if it needs to stay in the other half the mold to firm up before removing. Once the shape is firm enough, remove it completely and place it on an absorbent surface like a project board, piece of drywall, or several layers of newspaper.

**Step 7:** Use a metal rib from the basic tool set to smooth the seam line areas and any other areas that require smoothing. Patterns and lines in the clay add character, so don't worry about removing every line.

**Step 8:** Move on to the section headed "Add Glass Chambers."





## Create a Shape — Casting

### Casting Materials

Ceramic molds of choice

Mold straps or bands

Casting slip compatible with clay listed above

Fettling knife

Mold casting is done using plaster molds and liquid clay called slip. These molds are available from a variety of manufacturers and can easily be cast in a home, classroom, or studio setting. It's a quick and easy way to produce consistent shapes.

**Step 1:** Open the mold halves and brush away any dust. Tightly fasten the mold halves together with mold straps or bands.

**Step 2:** Mix the slip thoroughly and pour into the mold. Allow it to sit and watch for the slip level to drop in the mold as the mold absorbs moisture. Refill if needed. Watch for the thickness of the clay wall to reach the desired depth. The thickness of the slip and dryness of the mold will ultimately determine the time needed, but generally smaller molds may take 10 to 15 minutes and larger molds could require a half hour or longer before dumping.

**Step 3:** Once the clay walls reach the desired thickness, turn the mold over slowly and pour the excess slip

into a container. Don't tip too fast — if you hear a chugging sound, pull the mold back and allow it to drain more slowly. Chugging can cause shapes to collapse.

**Step 4:** Once all excess slip has drained from the mold, set it back upright and allow the remaining clay walls to set up. The mold will continue to absorb moisture from the inner coating of slip.

**Step 5:** Many variables will affect how long the mold needs to sit before you can remove the clay shape. This could be anywhere from one to several hours. Watch for the clay along the top edge of the mold to pull away. This is usually a sign that it's time. Use the fettling knife to trim away excess clay around the top opening and from the mold exterior. Then turn the mold on its side and remove the strap. Gently remove the top half of the mold, lifting it straight up.

**Step 6:** Feel the bottom of the shape. Once it feels firm enough to stand on its own, remove it from the mold and stand it on an absorbent surface like a project board.

**Step 7:** Move on to the section headed "Add Glass Chambers."

*For a more in-depth article on casting with molds, visit [www.firedartsandcrafts.com](http://www.firedartsandcrafts.com), click on the lesson plans tab, and see the free articles under "Molds."*



This clay-puzzled vase combines solid clay and coils. After firing to cone 04, I applied one coat of Mayco EL-120 Black Ice with the stiff fan, wiped it back with a damp sponge, and applied two coats of clear glaze before stiling and firing to cone 06. I added glass frit along with iridized and dichroic glass pieces in the top spaces and fired the piece again to around 1,400 F.





I developed the pattern in this clay-puzzled vase by rolling clay coils into spirals as I placed them in the mold. After removing the shape from the mold, I added the coil at the top to hold the glass as well as the coils inside the lip and running down the neck. After firing to cone 04, I used the stiff fan to apply one coat of randomly applied Mayco SC-72 Grape Jelly, SC-9 Jaded, and SC-10 Teal Next Time. The colors were wiped back with a damp sponge, then I splattered SC-15 Tuxedo over the surface. Finally I applied two coats of clear glaze to the exterior and rolled one coat inside before stiling and firing to cone 06. After adding glass frit, I stilted and fired the piece again to around 1,400 F.

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This clay-puzzled vase had texture carved into the sides in the wet-clay stage using a wooden sculpting tool. After firing to cone 04, I applied one coat of Mayco SC-12 Moody Blue with a stiff fan and wiped it back with a damp sponge. I applied clear glaze inside and out, then stilted and fired the piece to cone 06. After spooning glass frit into the crevices, I stilted and fired it again to around 1,400 degrees F.

### Add Glass Chambers

As mentioned at the beginning of this article, the original concept was to create clay shapes and then carve out crevices and patterns for the glass. But



sometimes the cuts were too deep and created holes, or some spots got too thin and cracked because they dried faster. So I pulled out my handy-dandy extruder and made clay coils to build up outlines of the areas where I wanted to add glass. Keep in mind these steps need to be completed while the clay forms are still wet. Adding wet clay to dry surfaces will not work because the moist clay will generally shrink as it dries, resulting in cracks. But you also need to make sure the clay forms are firm enough to stand on their own while you add the coils. And finally, make certain you use the same or compatible clay for

the coils as was used to construct the shape.

**Step 1:** Keep your clay shape on a project board so it's easy to turn and move without picking it up. A turntable can also make it easier. Determine the pattern you wish to make by attaching the coils. They can be added in any pattern and placed anywhere on the shape for design. However, areas where glass will be placed should be on nearly flat spots.

**Step 2:** Load the extruder with clay and insert the desired die. Extrude coils of clay. Don't extrude more than you will use in a short period as they can dry out quickly.

**Step 3:** Add slip to the shape in the areas where the coils will be attached (a few inches at a time). Quickly place the coils on top of the slip. Make sure the areas where glass will be fused are surrounded by coils.

**Step 4:** Brush slip over any gaps and smooth imperfections.

**Step 5:** Allow the shape to dry completely for a week or more. The heavier the item, the longer it should dry. It also helps to place the item on top of a kiln that's firing after it's dried for a week.

**Step 6:** Use a damp sponge or brush to smooth any imperfections on the shape before firing.

**Step 7:** Fire the items to the appropriate temperature for the clay body selected.

**Step 8:** Decorate the shape with glazes, let it dry, and fire to the appropriate temperature for the glazes used.

**Step 9:** Place glass frit in the cavity areas, then fire the shape to fuse the glass at the desired temperature. Every kiln will fire differently, but most glass starts to soften around 1,300 degrees Fahrenheit.

### What can go wrong?

When I try out a new idea, it can result in dozens of samples and trials before I figure out what works. Sometimes an idea (or a part of it) doesn't work at all! With this project, I wanted to see if clay and commercial glazes could be successfully fired in a glass kiln with a maximum firing temperature of 1,700 F. Low-fire clays are usually fired to more than 1,900 F, while glazes are fired at slightly cooler temperatures. I created a variety of clay shapes, fired them to 1,700 F, then glazed and fired again to 1,700 F. The items turned out OK, however, items with glaze coating both the inside and the outside did show some bubbles in the glaze, and some of the glazes were not as shiny or as bright they would have been if fired to the proper temperature. I also

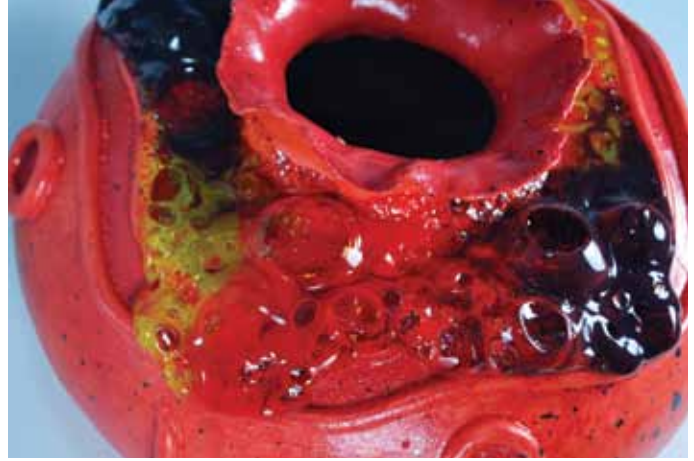
knew these items would not be food-safe and would not hold water. They would be decorative only.

So after creating dozens of samples and comparing the results, I was ready to make my final samples. Again, I created the shapes, fired the clay, and glazed. This time, I added glass frit before the final glaze firing. I already knew glass would melt flat at this temperature from other projects I had done in the past. But when I opened the kiln, I couldn't believe what I saw — the glass had bubbled and in spots overflowed the design outlines. What happened?

At first glance, it might look like the kiln overfired, but I quickly realized it wasn't the kiln's fault. When clay is fired, it releases moisture and gas. The first firing, to 1,700 F, wasn't hot enough to release everything. When I applied the glaze and glass and fired the ware the second time, more gases were released, and bubbled up through the glaze and glass.

Could this be used to make an attractive design? It certainly could! It's just not what I expected on these shapes, and it forced the glass to flow out of the areas I had selected for it. By firing the clay bodies to maturity, glazing and firing to the correct temperature, and only then adding the glass and firing for a third and final time, I prevented issues with bubbles.

Could I have done something different to make this work in a glass kiln? If I had fired the clay to 1,700 F, fired the glaze to 1,700 F, and then added the glass and fired to a tack-fuse temperature of between 1,300 and 1,500, it would have worked just fine. The main



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drawback to firing at these cooler temperatures is that the clay is not going to be as hard. It will chip easier, and you run the risk of the glaze bubbling if you coat both sides of the clay. And as mentioned, they are not food-safe and will not hold water. But it can be done.

*For additional lesson plans combining clay and glass, click the lesson plans tab at [www.firedartsandcrafts.com](http://www.firedartsandcrafts.com)*

*mail at P.O. Box 108, Iola, WI 54945, by phone at (715) 281-6450, or by e-mail at [info@claypuzzling.com](mailto:info@claypuzzling.com). Visit his website at [www.claypuzzling.com](http://www.claypuzzling.com).*

## Sources

Clay Puzzling: [www.claypuzzling.com](http://www.claypuzzling.com)

Mayco: [www.maycocolors.com](http://www.maycocolors.com)

Continental Clay: [www.continentalclay.com](http://www.continentalclay.com)

## Advanced Methods

Create defined designs on thrown or cast plates by adding the coils in your desired design on the wet clay. Allow the ware to dry, fire, glaze, fire and add frit before firing one last time to around 1,400 degrees F.

Create unique patterns like the plate shown above, but with different designs. Make glass beads by placing small strips of fiber paper between layers of scrap glass so that they can be strung and used as accents for a piece.



I constructed this clay-puzzled vase with all coils on the top and solid on the bottom. Once it was fired to cone 04, I applied one coat of Mayco FN-007 Green with the stiff fan and wiped it back with a damp sponge. After applying two coats of clear to the exterior, I stilted and fired it to cone 06. Then I placed chips of iridized glass around the top, stilted it and fired again to around 1,400 F.

**About the Artist:** *Michael Harbridge has been teaching fired-arts workshops for more than 35 years and is the educational arts manager for Royal & Langnickel Brush and the creator of clay puzzling. He can be contacted by*

## David Hoff ...Fired Arts Educator

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