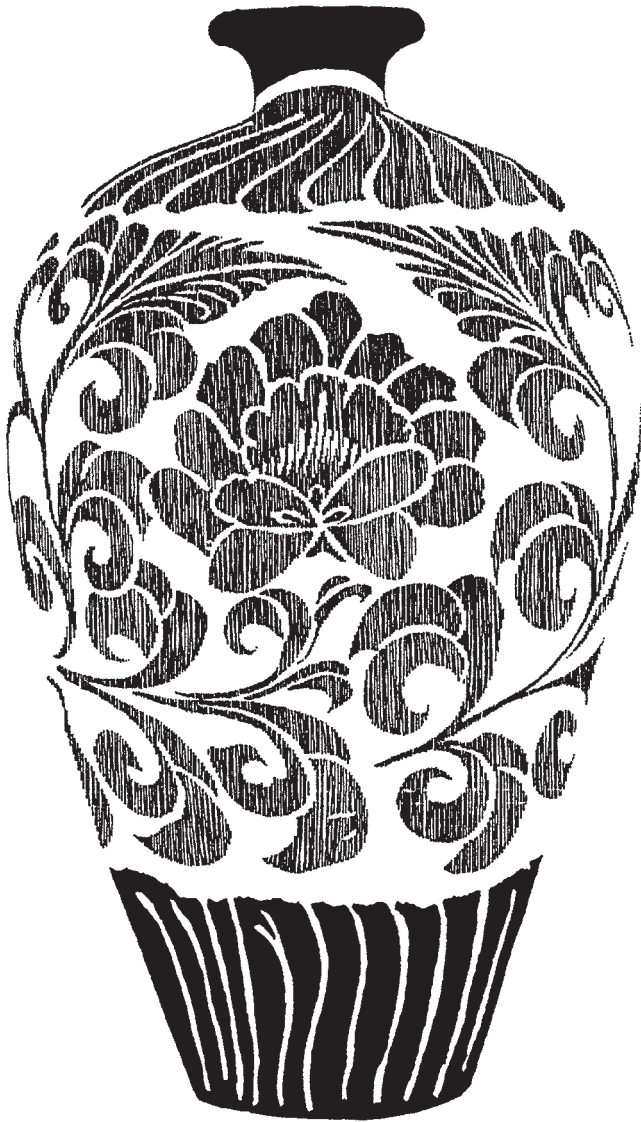




4-H Cast Ceramics



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4-H Cast Ceramics

Welcome to 4-H Ceramics! We prepared this manual to provide you with a basic knowledge of cast ceramics.

Ceramics is defined as anything fired in a kiln. A **kiln** is an oven or furnace in which clay products are baked. Ceramics may be pottery, brick, enamel, glass, sewer pipe, tile, terra cotta, etc.

This project is limited to clay projects that are **cast** or made in plaster-of-Paris molds.

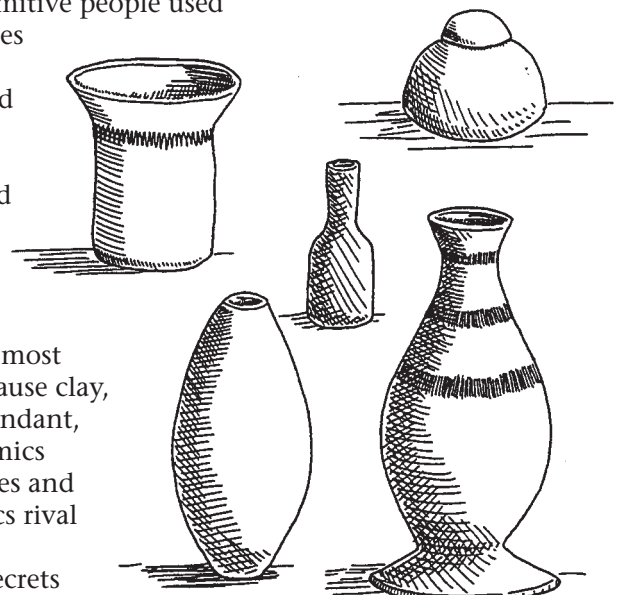
History of Ceramics

Ceramics is one of the oldest and most enduring forms of art known to humans. There is evidence showing that even the most primitive people used clay for pottery. Much of the story of early civilization comes from pottery remains unearthed by archaeologists.

The greatest developments in early pottery are credited to the Chinese, Egyptians, and Greeks. European pottery flourished during the Renaissance. On the American continents, pottery making goes back to about 500 B.C. and was found mostly in Central and South America. In the southwestern part of the United States, pottery making goes back to about 500 A.D.

World War II played an important part in developing the ceramic industries in the United States. Before the war, most ceramic items sold in the United States were imported. Because clay, carbonates, and oxides used for coloring ceramics were abundant, Americans began to produce their own pottery. Many ceramics shops started with little more than some night school classes and several hundred dollars in capital. Today, American ceramics rival those made in other countries.

Ceramists often follow clay recipes that are guarded secrets passed on within a family. Too often, valuable recipes die with the families, and we are unable to reproduce some fine quality ceramics.



Early ceramics forms

Project Requirements

This project manual is divided into five sections: Glazes, Underglazes, Overglazes, Unfired Finishes, and One-of-a-Kind Finishes and Designs. You can learn a variety of skills within each section and can repeat each section as many times as you wish. We developed the material so you may take the sections in any order. However, because the last section (One-of-a-Kind Finishes and Designs) is a more advanced technique, we recommend you have experience with glazes and underglazes before attempting it.

Each year, plan to try new techniques and learn a minimum of three skills. Articles made may not be exhibited more than once at the same fair or show.

Objectives

- Learn new techniques in cast ceramics
- Gain a greater appreciation of cast ceramics

- Learn to recognize and appreciate the quality of clay products
- Have fun while learning a different art form
- Gain self-confidence through another means of self-expression
- Strengthen communication skills by sharing the knowledge gained in this project with others

Ceramic clays

In each of the five project sections, you may use any of three clays: earthenware, stoneware, or porcelain, each of which has advantages and disadvantages. **Earthenware** is the most popular because of its availability and versatility, and it is reasonably priced. However, it does have a greater tendency to chip.

Stoneware is highly chip resistant, so it is popular in dinnerware. It also comes in many colors, but it can be quite expensive. **Porcelain** is the most expensive of the clays, comes in many colors, and is very refined. It is very delicate in greenware but is highly chip resistant when fired.

Visit different shops and look at finished pieces from each clay. Ask which clay the shop owner uses, and if other clays are fired in that shop.

Ceramics hobby shops

Since much of your ceramic work will be done in a shop rather than your home, remember always to be thoughtful and courteous to the proprietor and other customers in the shop. Follow the posted rules, be careful when using tools and supplies, and leave your work area neat and clean. Clean the tools where designated, because clay water can cause plumbing problems.

Some shops will supply all the tools, supplies, work areas, and firing needed to complete the piece. Some shops charge the customers a finishing fee in proportion to the cost of the greenware; other shops sell you the greenware and the firings, but you buy all the tools and other supplies necessary to finish your piece. By working in a shop, you can usually do ceramics with a minimum of cost for tools, paints, and supplies.

The Ceramic Process

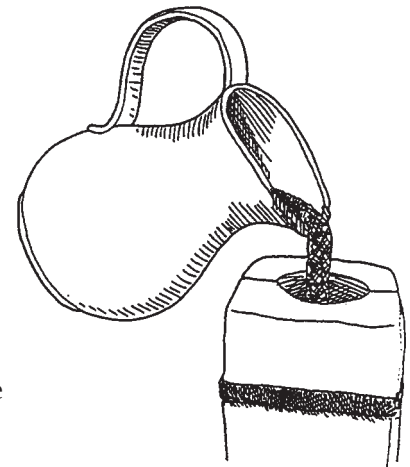
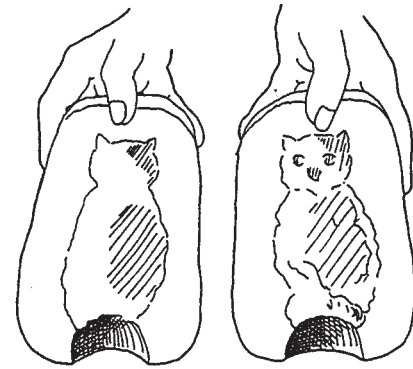
Cast ceramics are made by mixing clay, water, and chemicals together. This cream-like liquid is called **slip** and is poured into molds. The molds are hollow shapes made of plaster of Paris. The molds absorb the water from the slip leaving a layer of solid clay near the porous plaster-of-Paris mold. The excess slip is poured out of the mold and can be reused.

The length of time the slip is left in the mold depends on the size and thickness of the item being made. Small items may take only about 5 minutes, while larger pieces could take 30 minutes or more.

The mold is then removed and the formed piece trimmed. Now it is called **greenware**. It is set aside and allowed to dry and harden for at least 24 hours. Newly formed greenware is very soft and can still be molded and shaped to a certain extent until it has been allowed to harden.

Your first experience with cast ceramics is likely to be in a ceramics studio where you select your first piece of greenware. As you survey the shelves, you won't see anything that even remotely resembles green. They're "green" because they're not done—like unripe fruit.

Be extremely careful when handling greenware as it is very fragile and breaks easily. The greenware items may remain in this stage indefinitely.



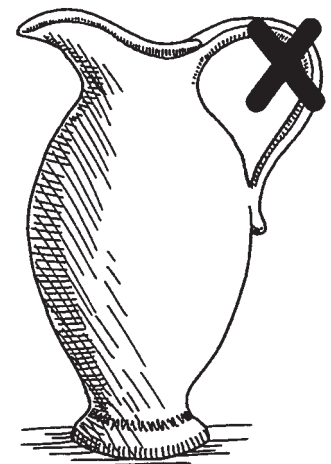
Selecting greenware

Look for a piece that has good detailing in the design. Be sure to check the thickness of the piece. If a piece is too thin, it will break easily during cleaning. Remember that greenware is extremely fragile! Never lift greenware by handles or edges; use both hands and lift it carefully from the bottom. Also check for major flaws, uneven seam lines, and warping.

Cleaning greenware

After you've selected a piece of greenware, you'll be told to clean it. In this step, you will **fettle** or clean your greenware. That means you are simply removing seam lines and imperfections before kiln firing. The following steps tell how to clean greenware.

1. Thoroughly clean your hands before touching greenware. Hand lotion, grease, oil, hand cream, and salt will absorb into the clay. Oil will keep glazes from sticking and salt will affect some glazes. It is better not to eat or drink while you are working. Accidents from food and spilled drinks can spoil your work and that of people working around you.
2. Cover your work area with newspaper or an old towel. **Never use wax paper** because it will leave a wax resistance wherever it touches the greenware.
3. Pieces should be dry before cleaning, unless the technique you are using requires wet greenware. Use your cleanup tool. Gently scrape or cut away the seams and flaws, taking care not to cut into the greenware. Use short, gentle strokes. Gradually trim the seam or **fettling line** until it is level with the surface. Save the dust and trimmings from this process for repairs or pinholes.
4. Use a grit cloth or a sponge scrubbing pad to finish cleaning seams and flaws. Use a gentle circular motion whenever possible. Take care not to dig



Don't pick up greenware by the handle!

in too deeply and leave scratches. Never use grit cloth or a scrubber on detailed areas, or you may accidentally wipe off the detail.

5. Fill any pinholes that appear in the article. To do this, dip your finger in water, then press it into the dust left from cleaning. Press this damp dust into the damaged area. If bubbles appear, repeat the process until the area is filled. Add a small amount of water to your fingertip and smooth out the filled area.
6. Now is the time to sign or initial and date your article. Use your cleanup or sgraffito tool or a stylus to incise (carve) your name or initials and date in an area that will not show during display of the article (for example, the bottom of the piece).
7. Be sure to clean the bottom of your article. A smooth base will make your piece set firmly and keep it from scratching any surface it is placed on.
8. When you are finished, use a damp (not wet) silk or natural sponge to gently wipe down the entire piece. Take care not to over-sponge! Over-sponging will make a rough, sandy surface, smooth out detail lines, and cause "hard spots" in greenware. To remove dust from detail areas, use a soft, dry brush.

Mending greenware

No matter how carefully you handle greenware items, occasionally items will break. To attach or mend dry greenware pieces, use a specially formulated mending product. Moisten areas to be attached with water and apply the mending product to each area with a brush. Quickly fit the pieces together. Hold the pieces together for a few seconds and use the brush to smooth any excess product that may show around the joined area. Allow to dry. During your normal greenware cleaning procedure, use a cleanup tool or grit cloth to smooth this area.

Kilns and firings

Now your item is ready to be fired, or painted with underglazes and then fired. If your 4-H leader has a kiln, he/she can fire your piece for you. If not, we recommend you have your firing done at a local ceramics studio. If your item is to be fired more than once, be sure it is fired by the same studio so they use the proper cone.

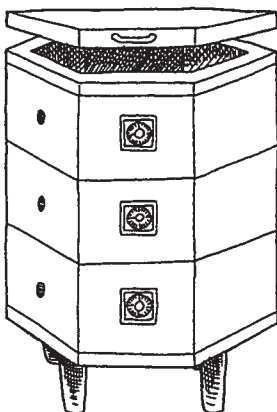
Firing

Use extreme care when working around a kiln, as it gets very hot.

Most shop owners will not permit you access to the kiln, for safety reasons. Many also have personal preferences for loading and unloading the kiln. Because of their intense heat, kilns can be dangerous. Improper loading, firing too rapidly, or opening the kiln too soon can cause damage to the pieces being fired and to the kiln. All of your efforts can be spoiled easily by carelessness. If you own a kiln or have access to one, read the owner's manual and follow the directions carefully!

Bisque

When greenware is fired in a kiln, the moisture is removed and the greenware becomes a hard form called **bisque**. The gray color changes to pure white. The bisque (fired) item is now more durable and ready to decorate with stain or glaze. If the bisque ware has been allowed to set for a long



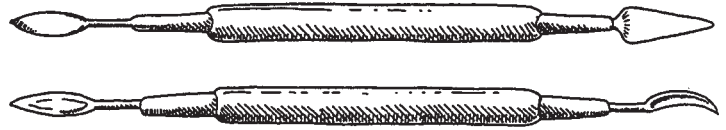
Kiln

time, remove all dust before you begin to decorate it. Stain and glaze will not adhere to dirty surfaces and will peel off or leave dry, bare spots after the piece is fired.

Tools and Brushes

Cleanup tool

The most popular tool for general cleanup of slip-casted greenware and stoneware.



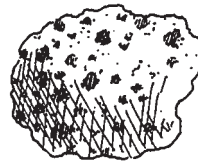
Palette knife

Used to mix paints and grinding china paints used on porcelain.



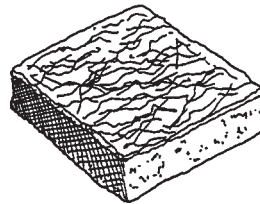
Sponge

A silk or natural sponge to wipe excess dust from greenware and bisque (fired greenware) It may be used in applying glaze and texture decorating.



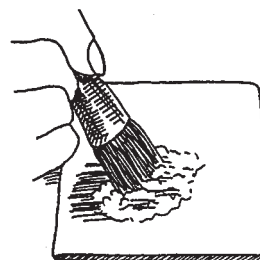
Grit cloth

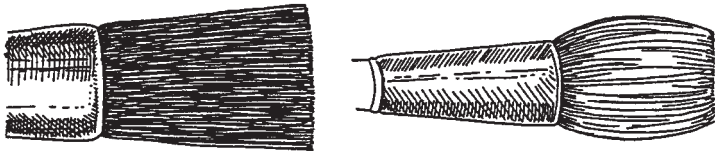
Used to finish smoothing seams on greenware.



Glazed tile

Surface for mixing paint. For a possible project, you may want to cast or purchase a greenware tile and make your own glazed tile.





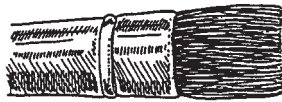
Glaze brush

Used to apply glaze and underglazes (if applying underglaze in a large area).



Stiff bristle brush (stain brush)

Used for design, full coverage of textured areas, lettering, stippling, and dry brushing.



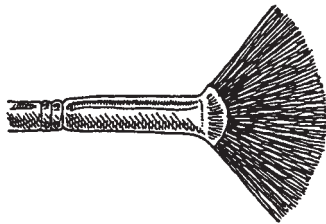
Translucent brush

For application of oil-based translucents. You also can use it to dry brush oil-based colors and chalks.



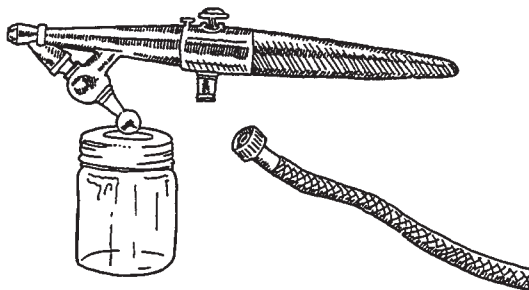
Detail brush

Excellent to paint features (eyes, eyebrows, etc.) and fine lines.



Fan brush

For applying crystalline glazes.

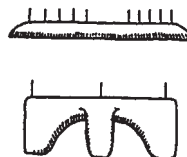


Air brush

Small spray gun for applying glaze, underglaze, or stains. Also for shading and general decorating.

Stilts

A support used to hold a glazed article above the kiln shelf during firing.



Containers

Anything that will hold water for cleaning your greenware, brushes, and sponges.



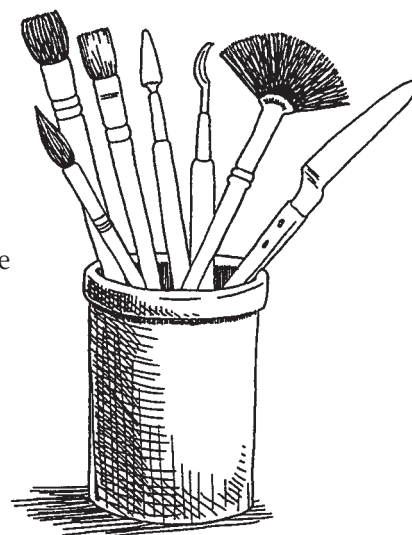
Care of tools and brushes

Most tools are wood, metal, or plastic and require little care. However, brushes are expensive and require great care. Store them with the bristles facing up so they will keep their proper shape. If a brush loses its shape, restore it by dipping it in liquid dish soap or hair setting lotion. Reshape it gently with your fingers and let it dry overnight. Before using the brush, be sure to wash it thoroughly.

Most glazes, underglazes, and stains are water soluble, so you can clean brushes with soap and water. To do this, make a paste in the palm of your hand with the soap and water. Stroke the bristles back and forth in the paste until they are completely covered. Then gently separate the bristles and place the brush under running water until it is completely cleaned. Reshape bristles if necessary and let dry.

Use mineral spirits to clean a brush that has been used for translucent antiquing stains. Brushes used in translucent antiquing stains should be used only in this medium, even if they are thoroughly cleaned.

Overglaze brushes require cleaning with a special cleaning agent. Read the jar label for complete instructions.



Evaluating Ceramic Projects

The following are standards for evaluating ceramics projects. Additional specific evaluation standards are listed at the end of each section of this project manual.

- Item should have no visible seam lines (proper cleaning).
- Item should sit squarely on flat surface without tipping or rocking.
- Bottom should be finished appropriately.
- Item should have good design for intended use.
- Item should show no evidence of mending.
- Attachments should be firm, without visible cracks or seams.
- Item should have uniform thickness.
- Applied decoration should enhance the overall design.
- Colors selected should be in keeping with nature (i.e., dogs are not purple).
- No water lines should show on the piece.

Section I: Glazes

Glaze is a glass-like substance put over the clay ware. When it is fired, the glass-like particles melt to produce a smooth effect. There are many kinds and colors of glazes available. Besides adding beauty to the ware, the glaze makes it waterproof. Glazed ware is less likely to discolor and is easier to clean. Do not use glazes containing lead for ware intended for food or drink due to lead poisoning danger.

Glazes can be **flowing** or **non-flowing**. Flowing glazes creep or flow when they are fired. They are easy for a beginner to use, as it doesn't matter if they are applied evenly or not. The flow will cover imperfections in the ware and even out when fired. If two colors are used, they will bleed or run together. Unless you want this as a special effect, it is better to use only one color.

Non-flowing glazes stay where they are put. They are better to use when applying more than one color at a time, because they do not run together. They won't flow over or cover imperfections when fired.

There are several kinds of glazes. **Transparent glazes** pick up the details on the ware, and you can see through them. They can be clear or colored. **Opaque glazes** are solid, and you cannot see through them. **Matte glazes** have a dull finish with very little shine. **Gloss glazes** have a very shiny finish; **semi-matte glazes** have only a slightly shiny finish.

Applying glaze

Glaze can be applied in several ways: with a brush, sponge, or airbrush, or by dipping. The method depends on your item and the type of glaze you are using. Ask your shop owner which method he or she recommends for his or her ware.

Handle all glazes with care. Avoid splashing them around your eyes, nose, and mouth. Be sure to wash your hands after working with glaze to avoid irritating your skin.

Apply glaze in three thin coats. Be sure to read directions, because some specialty glazes require more than three coats and most clear glazes require only two. It is important to cover the piece entirely with glaze so there are no bare spots after firing. Too much glaze will cause the glaze to crack or peel during the firing.

One way of applying the glaze is to apply the first coat in a circular motion around the piece. The second coat is applied in an up-and-down, bottom-to-top motion. The third coat is applied in a circular motion. This method usually assures that the item is covered completely.

Usually the bottom is painted with glaze; however, too much crystal glaze on the bottom will make it uneven and the glaze will run in the kiln. Some commercial items do not have glaze on the bottom. This is called **dry footing**. It is done when items are mass produced to save glaze and so the items do not have to be put on stilts in the kiln.

Glazed ware also may be antiqued. The antiquing solution is applied over the glaze which has been fired. It is then wiped back to obtain the effect you want, and then it is fired again.

You can use metal oxide washes to achieve a similar effect. The wash is usually applied to the bisque with a sponge. First you moisten the ware, then apply the wash and wipe it off the detailed areas with a clean cloth. It is then refired. You can use glazes for the wash process, then cover the item with a clear glaze. It may be fired after the glaze is rubbed back, or the clear glaze can be applied after the wash glaze has dried and the item fired then.

Glaze inside of a piece by pouring glaze inside and rolling it around so the entire surface is covered. Pour off the excess and touch up the rim with a brush. You will need to thin the glaze a little for this.

When applying finishes that need to be fired (underglaze, glaze, decal, overglaze, metallic, or luster glaze), apply the one that fires at the highest temperature first and the one that fires at the lowest temperature last. Check with your shop proprietor for the exact order of use. Luster glazes are sticky and take a long time to dry. Metallic and luster glazes are hard to apply.

Glazes are heavy and tend to settle to the bottom of the jars. Remember to stir them often while using them. Do not stir luster glazes.

A glaze is not required on stoneware and porcelain for decorative use but is required on utility ware such as cups, saucers, plates, etc.

Following is a list of skills to try when learning about glazes.

1. **Gloss glaze** (opaque, semi-opaque, transparent, semi-transparent)
Glazes that give a glass finish.
2. **Art glaze** (gloss, satin, matte)
Glazes that give two to three shades of color.
3. **Crystal glaze** (gloss, satin, matte)
Glazes with hard chips of color that fuse in the firing, to give you a beautiful array of colors.
4. **Crackle glaze** (gloss, stain, matte)
Glazes that produce a decorative network of cracks in the glaze, which is apparent after a stain is applied and wiped off.
5. **Satin glaze** (one color)
Glazes that have a sheen of satin rather than glossy.
6. **Matte glaze** (one color)
Glazes that give a dull finish.
7. **Woodgrain glaze**
Satin or matte glazes, with a soft crystal, used to simulate the look of natural wood. More suitable for earthenware.
8. **Textural glazes**
Glazes that bubble and froth during the firing, creating varying textures ranging from fine to coarse.
9. **Special-effect glazes**
A group of glazes used to create a variety of special effects. Some may be used alone to simulate wood or iron, while others used in combination will create patterns. Also used under, over, or between coats of colored glazes.
10. **Antiquing**
Use glaze as a wash.
11. **Combinations** (mingled)
Multi-glazes flowing together haphazardly in the firing for a multicolored effect.
12. **Combinations** (controlled)
Deliberate placement of colors to attain a specific effect when fired.
13. **Sgraffito**
Cutting through glaze to form a design.
14. **Glaze inlay**
Inlay of glaze into certain areas of pattern, such as mosaic.
15. **Majolica**
Glaze or underglaze decoration over fired or unfired glaze.
16. **Miscellaneous**
Combination of techniques or any other technique not listed.

Standards for evaluating glazed projects

Basic glaze

- Glaze color and texture should enhance the item.
- Glaze should be smooth and even in color.
- Glaze should be clear, not cloudy from application of too much glaze, or speckled from floating glaze in kiln.
- Item should show minimum of stilt marks.
- Type of glaze should be suitable to use (for example, lead-free glazes for pieces that will contain food).

Satin, matte, and woodgrain glazes

- Glaze should have satiny, soft, smooth finish.
- Woodgrain should give a wood-like appearance.
- Glaze should enhance overall design of item.
- Item should show minimum of stilt marks.

Common problems, causes, and solutions for glazes

Problem	Causes/Solutions
Reds develop dark spots	Fumes from greenware or migrating colors or insufficient oxygen.
Red turns grey	Overfiring or insufficient glaze. Reglaze and refire.
Green migrates	Some greens do this; do not place near reds or pastel colors; safest to fire them on the top shelf.
Dark gray areas in the middle	Unburned carbon due to lack of oxygen. Refire plate singly or boxed, one cone hotter before glazing. If this stain is glazed over, it cannot be removed.
Pinholes in glaze	Bubbles formed and glaze cooled before glaze could level. Can be eliminated by soaking for 1 hour (when kiln shuts off, turn all switches back on low for 1 hour). Most common when glaze is fired on greenware. Can be corrected by reglazing and refiring properly.
Blisters and craters	See “Pinholes in glaze” (above); grind off before reglazing.
Pyrometer does not react properly during high fire	When working with temperatures above 1,800 degrees F, insert the thermocouple in the kiln periodically to take temperature readings. Do not leave the thermocouple in the kiln throughout the firing period. Constant high temperature will shorten the life span of the pyrometer and decrease its efficiency.

Common problems, causes, and solutions for glazes (continued)

Problem	Causes/Solutions
Clear glaze has greenish or yellowish tinge in bottom of bowl, pitcher, etc.	Glaze was too thick and not drained from pieces but allowed to run to the bottom.
Glaze crawls on inside of vase	Probably caused by dust left in the bottom of the piece; touch up bare spots with more glaze and refire.
Glaze blisters on bare spots	Usually caused by air pockets or grease spots from body oils or dust left on bisque. Touch up bare spots and reglaze; file down blisters with emery stone; reglaze and refire.
Matte and/or satin glaze creeps, bare spots	Caused by dirt, dust, or oil. This also may happen when an attempt is made to reclaim a glaze that was allowed to dry in the jar.
Streaky colored glaze	Not enough coats applied; coats brushed instead of flowed on; color not stirred enough; coats not applied at right angles to each other. Piece can sometimes be saved by applying another heavy coat and refiring. Reglazing can be done more easily if the piece is warmed in the oven first.
Cup cracked in kiln	Could be caused by different rates of thermal expansion of the glaze on the outside and inside, when two or more glazes are used on the same piece. There is also a possibility of this occurring if the glazes are not from the same manufacturer.
Glaze settles, hard in jar	Probably too much water added and balance and suspension disturbed.
Satin and matte glazes show ridges and streaks	Glaze not applied smoothly and/or stirred enough.
Pinholes in glaze	Can be caused by underfired bisque, underfired glaze, or improper application of glaze. Pinholes are easier to prevent than correct. Before firing, polish the dry glaze with the heel of your hand. The fired piece can often be saved by reglazing and refiring.
Reds fade in firing	Can result from a too-thin application, insufficient stirring, possibly overfired, and contact with salt. Try reglazing and refiring.
Underglazed embossed piece, clearglazed; clear glaze opaque and milky in crevices	Glaze was applied too heavily. Sometimes firing to a higher cone will clear up the milky areas.
Glaze peels, creeps off unglazed areas	Usually caused by a too-heavy coat of underglaze. This error can sometimes be corrected by reglazing and refiring.

Common problems, causes, and solutions for glazes (continued)

Problem	Causes/Solutions
Clear glaze shows green, brown, and/or black specks, after glaze fire	Your brushes may have crusted ferrules. The black and brown glaze fire specks are iron fire rust; the green are nickel (many ferrules are nickel or nickel plated). Allowing brushes to stand in water not only ruins the bristles but also deteriorates the ferrule. Dry this area thoroughly before storing the brushes.
Difficulty in obtaining full coverage on large pieces when using clear glaze or any white glaze	<p>On a large piece, you apply the first coat of glaze over the entire piece, forget where the second coat began, and leave part of the piece unglazed, or get confused and have one coat of glaze on some parts and three on others. This can be prevented in two ways:</p> <ul style="list-style-type: none"> • Draw a pencil line from the top to the bottom of the piece, work in a clock-wise direction around the piece. When the line has been covered, one coat has been completed; repeat for each coat. • Tint the first coat of glaze with bluing or food coloring. You can tell exactly where the glaze was applied and the color will burn out; second coat untinted; third coat tinted (if needed).
Pinholes appearing in fired piece	Can be caused by incomplete escape of gases, usually from underfired bisque; possibly was not fired high enough in the glaze firing. Can sometimes be corrected by another coat of glaze and firing one cone higher.

Section II: Underglazes

An **underglaze** is a colored glaze used for painting or decorating before another glaze is applied. It may be applied to greenware or to bisque. Most underglazes work well on stoneware and porcelain. Underglazes will fade slightly when high fired and become a satin finish. Be sure to read label directions for firing each underglaze.

Following is a list of skills you may try when learning about underglazes:

1. **Detailing** (embossing) opaque, translucent, specialized, velvet.
Application of color to a design already in the greenware.
2. **Antiquing**
A method of applying color, then wiping it down.
3. **Burnishing**
A technique where a piece is polished before firing to make it smooth and shiny. Burnishing was practiced in prehistoric Egypt, Europe, the Middle East, and by Native Americans. The Pueblo Indians of New Mexico and Arizona are noted for their highly burnished ceramics. It continues to be practiced in the U.S. as well as parts of Africa.
4. **Texturing**
Thickened underglaze to form a textured pattern or background.
5. **Veiling**
Application of design using a sponge.
6. **Sgraffito**
The act of scratching a design through color.
7. **Stenciling**
Cut-out pattern used to apply a design by brushing, sponging, or spraying.
8. **Free brush design**
A brush design where the strokes of the brush are apparent.
9. **Majolica**
Underglaze applied over satin or matte glaze.
10. **Airbrush**
A device operated with compressed air that allows the operator to control a fine spray of color or decoration for a more realistic effect.
11. **Miscellaneous**
Combination of techniques or any other underglaze not listed. Include a technique sheet.

Standards for evaluating underglazes

- Underglaze should be used to enhance overall design and texture.
- Underglaze should result in even coloring except when antiquing or using a wash.
- Underglaze may be used to emphasize detail.

Common problems, causes, and solutions for underglazes

Problem	Causes/Solutions
Regular underglaze colors are streaky after glaze fire	Not enough coats were applied; brush dipped in water (before loading), diluting color.
Regular underglaze color appears faded after glaze firing	Can be caused by using a glaze that is not appropriate for the color; use the glaze and color from the same manufacturer. Overfiring may fade or change the quality of a color to mature to the proper tone. Refiring to the proper cone will bring out the true color. Color not stirred enough or too few coats applied.
Glaze chips, peels off underglazed piece	Could be caused by dust on the piece, or by underglaze applied too heavily; body oil from fingerprints resists glaze; hard spots or polished areas may resist glaze. Bisque may be underfired. To test bisque, scrape a metal coin on an inconspicuous area; if the coin cuts into the bisque, it is underfired; if the coin leaves a black mark, it is not underfired.
Pinholes form when glaze is being applied	Possibly from dust; piece must be completely dust-free before applying glaze. To correct, after glaze has dried, polish entire piece with the heel of your hand; this will force the glaze into the pinholes.
Cracked underglaze, pinholes during or after application	Can be caused by dust on ware, applying one coat before the previous one is dry, or by applying coats too heavily. Can be corrected by damp sponging over area to seal cracks. These cracks also may result from using very old colors.
Greenware resists underglaze	Usually caused by dust, body oils, hard spots, or polished areas. Sponge the greenware lightly with vinegar water, then apply underglaze.
Sponged pieces streaky	Color on sponge was dragged across piece instead of using the hot griddle approach.
Glaze peels off of wash-away pieces	The wax residue was not scrubbed away before glazing. Can be corrected by touching up with glaze and refiring.
Airbrush will not spray	Color may be too thick. Vent in top of color bottle may be clogged—check air supply for possible leak.
Airbrush “spatters”	Color may be too thin. Check airbrush color control—it may be turned wide open; color may contain foreign matter, or may not be strained sufficiently; you may be holding airbrush too close.
Airbrush “spits”	Foreign matter in line; insufficient air supply; color too thin.

Section III: Overglazes

Overglazes are applied after the ware has been glazed and fired. Decorative possibilities are unlimited with the use of underglazes and overglazes, including fine detail like eyelashes.

The following is a list of skills you may try when learning about overglazes.

1. **Fired lusters**
An iridescent or color luster finish applied over a glass finish, such as mother-of-pearl.
2. **Fired metallics**
Such as gold, platinum, or copper. Also metallics that give a halo or a weeping effect, such as halo gold.
3. **Decals**
An overglaze design or picture.
4. **Miscellaneous**
Combination of techniques or any other overglaze technique not listed.

Before firing each finish, be sure to read label directions regarding cone.

Common problems, causes, and solutions for china paint and other glazes

(such as mother-of-pearl, gold, white gold)

Problem	Causes/Solutions
Shiny china paint	Too much oil used in mixing.
Not enough color on brush	Color and/or brush out of condition. Color must be reworked with palette knife frequently while painting. If color is dry, add a drop of medium. Brush also must be conditioned frequently.
Fired china color is rough and dull	Underfired; refire to a hotter cone.
Fired piece very glossy, but colors faded	Overfired.
Fired piece good, some shiny spots	Color applied too heavily.
Pinks, ruby, etc., look brown after firing.	Underfired; fire to a hotter cone.
Pinks fired beautifully, blues faded	Not knowing the characteristic of your colors. Colors that require a hot fire must be painted and fired first; then colors that require a reduced heat are applied in another firing.

**Common problems, causes, and solutions for china paint and other glazes
(continued)**

Problem	Causes/Solutions
China paint blisters when fired	Color applied too heavily.
Gold has hairline separations	Fired too high for the type of ware. The piece can sometimes be reclaimed by another application of gold and refiring.
Gold has a cloudy look	Kiln was not vented long enough during firing. Keep lid propped until true red heat is reached. Heavy application.
Luster powders off when touched	Application too heavy. May be completely cleaned off and luster reapplied.
Gold and colors rub off	Underfired; refire to a hotter cone.
Streaky china painted design on porcelain bisque; colors will not blend	The bisque is probably underfired. Remove the color with turpentine and refire to a higher porcelain cone; could also be caused by insufficient polishing of the bisque.
Remove unfired gold without leaving purple streaks	Clean off gold with lacquer thinner, remove any residue with alcohol and lint-free cloth. Do not use turpentine.
Gold ran on fired piece; some purple stains	Gold applied too heavily. Remove unwanted gold and purple stains with a gold eraser or by a paste made from household scouring powder and water.
Dull Roman gold	Could be underfired; however, the usual cause is improper or insufficient burnishing. Burnish thoroughly with burnishing sand or a glass brush. If a glass brush is used, avoid getting ground glass under your skin.
Gold turns black where it touches china paint	This is a reaction of fluxes in the gold and in the china paint. Only unfluxed gold should touch china paint. The piece can sometimes be saved with enamel or paint decoration.
Fired Roman gold is pale and weak	Too much essence was added; applied gold should be dark brown before firing. The piece may be retouched with another coat of gold and refired.
Plate cracked in half during overglaze firing	Plate was probably not stilted, or firing was not slow enough. All stilted pieces should have space around them to allow for proper air circulation. The larger the piece fired at an overglaze firing, the slower the firing. It takes longer for heat to penetrate through a finished glaze to the bisque. Uneven heating and cooling can cause pieces to crack.

Section IV: Unfired Finishes (Stains)

Stains work well on outdoor items like flower pots, wind chimes, and statues, because they withstand weather. They will not crack or craze from exposure to temperature changes. Stains are water based and are not waterproof. They should not be used for items in which food or drink are served or for items you plan to wash often.

There are many colored stains that can be brushed or sponged onto the bisque. One coat is all that is needed, but be sure to cover the area completely. After the stain is dry, spray the ware with a resin solution to seal it. Stains should not be fired, as they will peel off in the kiln.

You may apply stain over another stain to bring out details like eyebrows, eyes, mouth, buttons, etc.

Antiquing brings out the detail on a stained piece. It consists of completing the piece, including a resin spray, then applying an antiquing solution and rubbing it into the detailed areas. The stain is then wiped back to obtain the desired effect. The piece is allowed to dry and sprayed again with the resin sealer.

Following is a list of skills you may try when learning about unfired finishes.

1. **Opaque stain**
A water-base stain that you cannot see through. Suitable for earthenware.
2. **Antiquing** (oil base, water base)
A method of applying color, then wiping down to simulate antique ware. Suitable for earthenware.
3. **Pearl**
A pearl-like finish, either opaque or translucent, with an iridescent sheen. Suitable for earthenware.
4. **Metallics**
Fine particles of metal-like material. May be in powder form or in a varnish, oil, resin, wax, or water-type base. Suitable for earthenware.
5. **Lusters**
A decorating medium that produces an iridescent sheen when applied over opaque colors or to bisque ware. Suitable for earthenware.
6. **Non-fired glazes**
A medium that simulates a gloss glaze and does not require a sealer. Suitable for earthenware.
7. **Dry brush** (opaque or translucent)
Applying color with a dry brush. Suitable for earthenware and porcelain.
8. **Chalks**
To be applied over a sealed piece of bisque. Suitable for earthenware and porcelain.
9. **Gold leafing**
A minute quantity of gold, beaten out into an extremely thin sheet and applied with adhesive to bisque. Suitable for earthenware.
10. **Rouging**
Applying color lightly with cloth or finger, or with a sponge. Suitable for earthenware.
11. **Sponge veiling**
Decorating with sponge and color. Suitable for earthenware.

12. Stenciling

Using a cut-out pattern to apply a design by brushing, sponging, or spraying.

13. Sculpture paste or powder

May be mixed with opaque stain for color build-up techniques. Suitable for earthenware.

14. Applied texture (sand, grog, paper, etc.)

Similar to sand painting. Suitable for earthenware.

15. Stain and glaze combination

Part of the item has fired glaze and stain is used to complete the design or effect. Suitable for earthenware.

16. Free brush

Brush design where strokes of the brush are apparent. Suitable for earthenware.

17. Découpage

Using commercial prints, hand-colored prints, or original drawing which is applied to a piece, then covered with several coats of lacquer or sealer. Also paper tole—the use of several prints to make three-dimensional pictures; and repoussé—design is lifted and stuffed. Suitable for earthenware.

18. Air brush

A spray gun used for applying color with the use of compressed air.

19. Miscellaneous

A combination of any of the above skills or any other unfired finish not listed.

Unfired finishes are used on decorative pieces only. Any piece used for food or beverage service or storage should not have an unfired finish. Most of these techniques are suitable for earthenware and porcelain. If a technique has been applied on stoneware and is well done and pleasing to the eye, it is acceptable.

Standards for evaluating unfired finishes

- Item finish should be suitable to use (i.e., do not use unfired finishes on dishes).
- Item should show no brush marks.
- Stain detail work (color) should enhance basic design.
- Color combinations should be pleasing and appropriate to item.
- Items which need to be sealed may be done in one of three ways; sprayed, brushed-on, or rubbed.
- Colors under antiquing should be bright and clear.
- Stenciled design should be sharp.
- Rouging items should be free of streak marks.

Common problems, causes, and solutions for unfired finishes

Problem	Causes/Solutions
Light spots on opaque stain	Probably too much water in the brush. Dipping the brush into water before dipping in the opaque stain dilutes the stain and causes streaking. It can also cause hard spots in bisque, corrected by gently patting a coat of opaque stain over the area and allowing to dry thoroughly before applying additional coat of color.
Translucent stain difficult to wipe down	<p>Opaque stain not properly sealed and/or thinly applied.</p> <p>Translucent color can sometimes be removed with a cloth dipped in solvent. Allow piece to dry, apply a gloss fixative, and start over.</p> <p>The stain can sometimes be fired off. Some stains will not fire off and leave a very interesting effect; metallics often leave a green residue on the bisque.</p> <p>Translucent stain also may be hard to wipe down if the fixative is not compatible to the stain. A water-based fixative will “re-soften” when a water-based translucent is applied over it: if the sealer has not dried thoroughly, it will cause the translucent to “grab.” Whenever possible, use all the products from the same company.</p>
Antiqued piece looks muddy	Usually caused by failure to turn cloth repeatedly to expose a clean surface. See above.

Section V: One-of-a-Kind Finishes and Designs

You can combine several techniques to produce special effects and one-of-a-kind designs. There are no rules and you are limited only by your imagination. By trying your own ideas, you are likely to produce some interesting effects (and you just might develop a new technique!). Check with your shop's proprietor, too, as new ideas and techniques for finishing ceramic items are constantly being developed.

Following is a list of skills to try when learning about one-of-a-kind finishes and designs.

1. Two glazes

Apply two colored glazes one over the other or "spill" one glaze over the other in an irregular pattern.

2. Incorporating "dark spots"

Add dust or metal impurities to the glaze to produce a speckled effect. Do not put impurities into the shop's regular glaze bottles unless you will be using all of the glaze on your pieces.

3. Spun designs

Pour a little glaze on a piece that is being spun at a high speed on a turntable like a potter's wheel.

4. Embedding a burnable material

Obtain a texturized effect by embedding a lace or paper doily into the surface of the moist clay deep enough to leave an impression. The item is fired and the lace or paper burns off, leaving a textured surface. You can then pick your own technique to finish the item.

5. Finger painting

Create your own designs with stain, glaze, luster, or metallic finishes to produce interesting effects.

6. Lumps of enamel pressed into the surface of moist greenware

These melt and spread slightly when fired to produce unusual effects. Lumps of enamel put on top of flat surfaces will melt and flow through the surrounding areas.

7. Sprigging

Attaching cast or hand-formed decorations to a clay body; for example, a design made in a press mold and attached to a leather-hard casting with slip or mending slip.

8. Carving

Incising (cutting into the surface of the greenware) and beveling of one side of incised line to raise and three-dimensionalize the pattern.

9. Texturing

Incising the background of the clay body to form a pattern.

10. Cut out (pierced)

Areas of clay body removed.

11. Clay lift

Lifting up certain areas of pattern while piece is still leather-hard; for example, feathers of a bird.

12. Chemically textured (distressed)

Use an acid product, such as vinegar or baking soda, on background to wear away surface (background or pattern).

13. Clay strip sculpture

Changing of original surface with strips of clay.

14. Applied decoration

Any dimensional decoration applied to a clay object.

15. Draping

Applying lace or other material to a figurine.

Additional Project Suggestions

There are many other phases of clay work you may wish to do after completing this project. A few examples are given here.

Stage a cast ceramic show. After completing the last phase of this project, you or your club could stage a show where you display your wares and show what you learned from these projects.

Continue with these ceramics projects. There are many ways to apply ceramic techniques. You may wish to develop some of them further by repeating the project sections using new techniques.

Learn to use a potter's wheel. Using a potter's wheel is a craft that is rewarding and well worth the effort.

Hand-crafted ceramics. The old skill of building pots or hand-crafted ceramics is one of few remaining authentic handcrafts. Two common techniques are the pinch method and the use of strips of clay ropes. Hand crafted ceramics can be a rewarding experience and provide an opportunity to experiment with various clay bodies.

Study various clay bodies. While clay bodies are found universally, they vary in their properties with location. You may wish to study and experiment with some of them.

“Cold ceramics.” Plaster of Paris is poured into rubber or plastic molds and allowed to harden. The items are solid and cannot be fired. Any of the techniques that apply to stains can be applied to them, including antiquing. After the final color is applied, they are sealed with a resin sealer. These are not true ceramics because they are not made from clay.

Additional study. Your local library may have books on ceramics and various ceramic processes that you might like to read. There will be books on color, texture, and design that may also interest you.

General Art Principles

Design

Lines and spaces, both narrow and wide, and combinations of both are used with texture, shade, shadow, and tone to form different designs. There is no limit to the ways in which these can be combined to form pleasing effects. Art design is considered to be the plan or structure of an object or the decorative scheme of a work of art. It includes drawing, carving, sketching, patterns, and outlines.

There are a variety of ways in which designs can be formed. Design can be hand painted, rubber stamped by hand or machine, decal transferred, or created by silk screen printing.

Texture

Texture represents the surface structure of an object like hair, skin, fur, and the like. It is the surface structure of a work of art. It can be anything that produces a different feel when it is touched. It can vary from smooth to very rough and uneven. Some of the techniques that produce a textured effect include crackle-tone, froth, and sand glazes; embossed, sgraffito, and overglazing techniques. The amount of sheen a glaze has can affect the way the texture appears.

Color

Color itself comes from light. All the colors are present in white light. The absence of color is black. The **primary colors** are yellow, red, and blue. From them it is possible to produce any of the other colors. When two of the primary colors are mixed together, the **secondary colors** (orange, green, violet) are produced. For example, mixing red and yellow produces orange; blue and yellow makes green; red and blue produces violet. When the primary and secondary colors beside each other on the color wheel are mixed, the **intermediate colors** are produced: yellow-orange, red-orange, red-violet, blue-violet, blue-green and yellow-green.

The colors containing more reds and yellows are the **warm colors**, while those containing more blues are the **cool colors**. The lightness or darkness of a color is called the **color value**. The difference in effect is due to light and dark. There are eight shades of gray between true white and true black. Pleasing contrasts can be made by using values from both ends of the value scale. This principle is also true for shades and tints. One color will affect another. For example, if you have a white background and lay on it a gray tone, the gray tone will look darker. But if you were to lay it on a black background, it would look lighter.

The color of an object is determined by three things: the color of the object itself, the color of the light under which the object is viewed, and the color of the surface which is reflecting back onto the object. Don't be afraid of colors—they are an adventure in themselves!

Reference Books

The Complete Book of Ceramic Art by Polly Rothenberg, Crown Publishers, Inc., New York, 1930.

Ceramic Techniques and Projects, a Sunset book, Menlo Park, CA, 1973.

How to Do Ceramics, Book I and Book II (No. 35 and 36), Foster Books, Foster Art Service, Inc., 430 West 6th St., Tustin, CA 92680.

How to Mix Colors and The Materials To Use (No. 56), Foster Books, Foster Art Service, Inc., 430 West 6th St., Tustin, CA 92680.

Glossary of Ceramics Terms

- Absorption** Degree of moisture which will soak into plaster when casting or into bisque when glazing or staining.
- Accenting** Emphasizing an area with lighter or darker colors, by shading or outlining.
- Adherence** Ability of a glaze, underglaze, or stain to stay in place on a given surface.
- Aging** Letting newly mixed casting slip set, undisturbed, for several days. During this aging period, all the materials will become properly blended and produce the best casting qualities.
- Airbrush** Small spray gun used for applying glaze, underglaze, or stains. Also used for shading and general decorating.
- Antiquing** Removing applied color to accentuate detail.
- Appliqué** Applying material such as lace, string, grog, etc., to ware. Also called draping.
- Banding wheel** A hand-operated turntable used to apply or blend bands of color and to accomplish other types of decorating.
- Binder** Material added to hold ceramic ingredients together, such as gum arabic.
- Bisque** Fired, unglazed objects of clay.
- Blistering** Broken bubbles on fired glaze surface.
- Blunger** A container with an agitator for mixing slip.
- Body** Term used to describe any formula of clay.
- Bone china** Articles made from a clay body that includes bone ash for translucency and strength.
- Bone-dry** Term used to describe greenware that is completely dry, containing no moisture.
- Brocade glaze** A non-flowing glaze that is applied with a tool or brush for raised designs.
- Burnishing** An ancient technique where a piece at leather-hard stage is polished with the back of a teaspoon or smooth stone to make it smooth and shiny before firing.
- Butting** Term used to describe placement of two or more glazes in close proximity on the same piece. The second glaze is applied so that it comes within the width of a pencil-point line of the first glaze but does not touch it. If the glazes accidentally touch, area is scraped clean with a cleanup tool, then retouched. The butting technique prevents glazes from flowing together during firing.
- Cascade glaze** A special effect used over a glaze. It is opaque and creates a waterfall of white blending with the color used.
- Casting** The process of filling a plaster mold with casting slip, thus creating a clay object.
- Casting slip** Liquid clay for mold casting.
- Ceramics** Clay objects given permanent shape by firing in a kiln.
- Chalks** Special colored chalks that are brushed over a sealed piece of bisque.
- China** Special type of clay body which produces a translucent quality.
- Clay carbon** Carbon-backed paper for transferring designs onto greenware or bisque.
- Clay lift** Lifting up areas of pattern while piece is still leather hard.
- Cleaning greenware** Removal of mold seam lines and imperfections from unfired clay objects.
- Cleanup tool** The tool used to clean greenware.
- Clear glaze** A transparent glaze, void of color when fired.
- Cloudy glaze** Glazing problem caused by glaze being applied too thick.
- Cone** Heat-measuring device used when firing a kiln. Usually a three-sided pyramidal form of clay and chemicals made to bend when a specific temperature is reached inside a kiln.
- Cool colors** Colors containing more blue.
- Crackle glaze** Glazes especially formulated to produce a delicate “crazed” surface pattern.
- Crawling** A glaze defect in which the glaze pulls away or crawls from the bisque.

- Crazing** Hair-like cracks that appear on a fired glaze surface. Often referred to as either immediate or delayed crazing.
- Crevice** A recessed area of greenware or bisque.
- Crystal glazes** Glazes combined with crystals which melt in the firing to form interesting patterns.
- Crystals** Specially formulated colored glazes that have been fired and then ground to various sizes.
- Decal** A picture or design, on special paper, transferred to a glazed surface and low fired for permanency.
- Découpage** A process whereby a cut-out design is applied to ware after which the ware receives several coats of lacquer or sealer.
- Deflocculent** An alkaline substance added to slip to increase flowing qualities without increasing water content.
- Detail brush** Used to paint facial features and fine lines
- Dipping** Coating an object with liquid glaze by immersion in a container of glaze.
- Discolored glaze** A glazing problem sometimes caused by firing greenware with other glazed articles.
- Draping** Applying lace or other material to a figurine.
- Drybrushing** Feathered-effect brushstroke achieved by using a dry brush with wet color.
- Dryfooting** Bottom area of article left unglazed so stiling is unnecessary. Not recommended for utility items.
- Dunting** Breaking away of clay body during firing, due to trapped air or foreign substance.
- Earthenware** Non-vitreous ware made from low-fire clays.
- Elements** Wires, in kiln, carrying electrical current for heating.
- Elephant ear** Fine-grained, thin sponge.
- Embossing** Forming a raised design.
- Engobe** Colored slip or clay. Also the term used when decorating an unfired clay object with colored casting slip or liquid clay.
- Fan brush** For applying crystalline glazes.
- Ferrule** The metal part of a paint brush that holds the bristles together.
- Fettle** To remove seam lines and imperfections in greenware.
- Fettling knife** Tool used to remove excess clay from the outside of the mold and from the mold pour hole.
- Fettling line** The seam lines on greenware that are created by the plaster-of-Paris mold.
- Firing** The process of maturing ceramic products by various degrees of heat.
- Firing chamber** Inside area of kiln.
- Flow** The term used when referring to the running or moving qualities of a glaze.
- Flux** Any substance added to clay or glaze to lower maturing temperature.
- Foot** Bottom of ceramic item.
- Free brush design** A brush design where the strokes of the brush are apparent.
- Free form** Shape with no uniformity.
- Froth** A breathing, bubble glaze usually applied on greenware with a brush or sponge.
- Furniture** Articles necessary to use full capacity of kiln space. Shelves, posts, and stilts.
- Glaze** A fired finish consisting of a prepared mixture of grit which produces a glass-like surface when fired.
- Glaze brush** A brush with full, long hairs for application of glaze and opaque underglaze.
- Glaze inlay** Inlay of glaze into certain areas of pattern, such as mosaic.
- Glazed tile** Surface for mixing paint.
- Gloss glaze** Shiny glaze.
- Gold leafing** A minute quantity of gold, beaten into an extremely thin sheet and applied to bisque with an adhesive.
- Graining** To create a wood-grained effect by incising greenware, using dry brushing bisque stains.
- Grainy** A glazing problem usually caused by a too-light application of glaze.
- Greenware** Unfired clay article.
- Greenware drill** A small tool with a threaded point used for drilling holes in dry greenware.

- Greenware saw** A small tool with a serrated edge used for cutting dry greenware.
- Grit cloth** An abrasive cloth for cleaning greenware.
- Grit sponge** A square sponge with an abrasive surface on one side.
- Grog** Ground-up bisque added to clay to reduce shrinkage and add strength. Sometimes changes texture.
- Hard spots** Areas that reject color and cause bare spots. Can be caused by oversponging greenware, but is generally caused by improper greenware casting.
- Hot griddle** A method of quickly dabbing paint onto a piece, as in touching a hot griddle.
- Hydrometer** Device to measure density of liquids.
- Impervious** Impenetrable.
- Incise** To cut the clay surface to create design.
- Incompatibility** Unsuitability of some paints for use together, because of unbalanced chemical effects.
- Kaolin** A clay used in certain clay bodies for whitening. Main ingredient in porcelain.
- Kiln** A heating chamber for hardening and maturing clay and glaze.
- Kiln wash** A coating for kiln shelves and bottom of kiln to protect them from glaze drippings.
- Lace tool** Long, pointed tool for use in applying lace to article.
- Lead-free glaze** Any glaze that is formulated without lead or cadmium compounds. Lead-free glazes are perfect for use on dinnerware and utility items.
- Leather-hard** A term used to describe cast or hand-formed clay items that are damp but firm enough to handle without losing shape.
- Liner brush** A brush with long, pointed hairs for fine lines and design work.
- Loading** To completely fill brush with color.
- Luster** An overglaze that imparts a lustrous surface to the ware.
- Majolica** Bright, brilliant, opaque gloss-finish glazes.
- Matte glaze** A glaze which produces a smooth, dull matte finish after firing.
- Maturing point** Temperature needed to mature glaze or clay.
- Mending** Repairing broken greenware or bisque.
- Metallic** Glaze with small flecks of metal for decorative purposes.
- Modeling clay** Prepared clay for hand modeling.
- Mold** A hollow plaster-of-Paris form in which articles are reproduced through the use of liquid clay (slip).
- Muffle** Heat-conducting pieces of pipe around firing chamber of gas kiln.
- Nichrome** A heat resistant type of wire.
- One-stroke** A highly concentrated, translucent underglaze paint used for detailed work, lines and brush stroke technique.
- Opaque** Non-transparent color.
- Overglaze** A decorative finish fired on a glazed surface.
- Palette knife** A flexible steel-bladed knife with no sharp point.
- Pat** Gently touching color to desired areas of ware with cloth, in an up-and-down motion.
- Pattern** A design that can be transferred to greenware or bisque.
- Pattern base glaze** A special-effect glaze used in combination with other glazes causing them to separate and form interesting designs.
- Pearl** A pearl-like finish with an iridescent sheen.
- Pinch** A method used to form handcrafted ceramics from clay.
- Pinholes** A glaze defect caused by underfired bisque, dust left on ware or in the kiln, applying glaze to greenware, or firing too rapidly.
- Plasticity** Pliability of modeling clay.
- Pooling or puddling** Fired glaze which has run to the bottom or puddled in detail of ware.
- Porcelain** A translucent clay body maturing at high temperature.
- Porosity** The permeability of fired or unfired clay.
- Posts** Supports for kiln shelves.

- Potter's wheel** Revolving wheel driven by hand, foot, or electric power, used in forming articles from modeling clay.
- Pottery** Any article formed from clay.
- Pouncing** Applying color to ware with quick up-and-down movements, using a brush or a sponge.
- Pyrometer** An instrument which indicates temperature in the kiln.
- Refractory** Heat-resistant material.
- Resin sealer** A product sprayed onto a stained piece to seal it.
- Rolling glaze** Method of covering inside area of ware, by rolling thinned glaze inside, then pouring out excess.
- Rouging** Applying opaque or translucent stains with a cloth, over an opaque base coat.
- Running** Refers to fluidity of a glaze at the point of maturity before cooling and hardening.
- Satin glaze** Glaze that has a sheen of satin rather than glossy.
- Score** To scratch tiny crisscross lines on areas of greenware that will be fastened together with clay slip.
- Scrubbing** Applying an initial priming coat of thinned opaque underglaze or glaze, or partially removing fired metallic overglaze from ware.
- Sculpture paste or powder** A product which may be mixed with opaque stain for colored build-up techniques.
- Seam** Ridge formed in greenware where mold pieces join.
- Sgraffito** Cutting through glaze to form a design.
- Sgraffito tool** Greenware cleanup tool.
- Slip** Cream-like liquid made of clay, water, and chemicals that is poured into plaster-of-Paris molds to form greenware.
- Soaking** Process of eliminating bubbles or pinholes in a glazed item. When the kiln shuts off, turn all switches back on low for 1 hour.
- Special-effect glaze** A group of glazes used to create a variety of special effects. Some are used alone to simulate wood or iron, while others used in combination will create patterns.
- Sponge** Silk or natural sponge used to wipe excess dust from greenware.
- Sprigging** Attaching cast or hand-formed decorations to a clay body.
- Stain brush** Used for design, full coverage of textured areas, lettering, stippling, and dry brushing.
- Stenciling** A cut-out pattern used to apply a design by brushing, sponging, or spraying.
- Stilts** A support used to hold a glazed article above the kiln shelf during firing.
- Stippling** To draw, paint, or engrave with dots or short touches instead of lines.
- Textural glazes** Glazes that bubble and froth during firing creating varying textures.
- Texturing** Incising or carving the background clay body to form a pattern.
- Translucent brush** For application of oil-based transluents and dry brushing chalks.
- Underglaze** A colored glaze applied to greenware or bisque; used for decorating before another glaze is applied.
- Veiling** Application of a design by using a sponge.
- Warm colors** Colors containing more reds and yellows.
- Wash** Similar to antiquing. Removing applied metal oxide color to accentuate detail.
- Wipe back** Wiping off applied color to accentuate detail.
- Woodgrain glazes** Satin or matte glazes, with a soft crystal, used to simulate the look of natural wood.

Notes



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