CERAMICS

4-H Project Manual

COLORADO STATE UNIVERSITY
EXTENSION

Acknowledgements

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Photos of 4-H Ceramics club members courtesy of Jaci Wagner, 4-H Youth Development / Family & Consumer Science, Logan County, Colorado State University Extension

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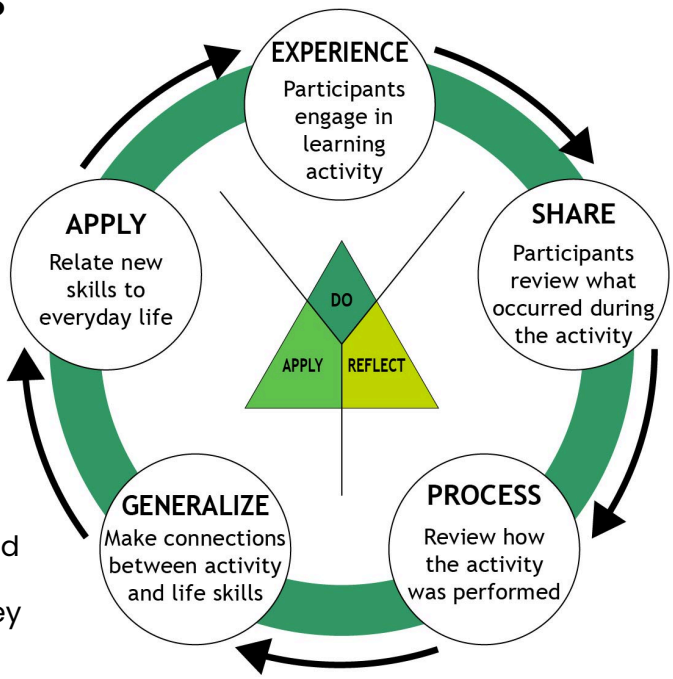
Experiential Learning Process

The 4-H program utilizes a process where adult leaders ask open-ended questions that challenge youth to think. Through this inquiry, youth can propose hypotheses and determine their own solutions. The Experiential Learning Model developed by Pfieffer and Jones (1985) and modified by 4-H includes five specific steps that can be summarized into three main processes: Do, Reflect, and Apply.



The Experiential Learning Model encourages discovery with minimal guidance from others. A situation, project or activity is undertaken for individual thought and problem solving. Minimum outside assistance is provided, but support is offered to the individual by questioning at each stage. The youth participating in an activity reflect on what they did and then assess how what they learned can be applied to a life situation. Below are questions that might help during each stage of learning.

1) Experience (Doing)
Questions: What sources of information are available? What is possible? What do you expect to see? How is it working? What else might you try?

2) Share (Reflecting on what occurred)
Questions: What was your goal for this project/activity when you began? What happened? What were the results? What was most difficult? How do you know? What did you learn? What surprised you? How did you share this project/activity with others?

3) Process (Reflecting on what's important)
Questions: What problems seemed to reoccur? How did you solve them? What similar experiences have you had? How was the experience like or unlike experiences others had? Would you do anything differently? What did you learn about making decisions? What suggestions would you have for someone else who wanted to do a similar project/activity? What life skills were you developing through your project? Why are life skills important? What new questions do you have about yourself, others, and future goals?

4) Generalize (So what?)
Questions: What did you learn about yourself or about the activity? What key points have you learned? How did you decide what to do? What else could you have done? How does this relate to something else in life? Where have you faced similar challenges in your life? Where might this situation occur in the future? Why is it important to have plenty of information before making decisions? What did you learn about your own skill in communicating with others?

5) Apply (Now what?)
Questions: How does this project/activity relate to your everyday life? Why is this project/activity important to you? Where else can this skill be used? How will you use this in the future? What will you do differently after this experience? How can I make an impact? What will I create next? In what ways do people help each other learn new things? What are qualities you think are important in a leader? If someone helped or mentored you in this project, what would you tell them you learned and what difference it has made in your life? How would you express your appreciation?

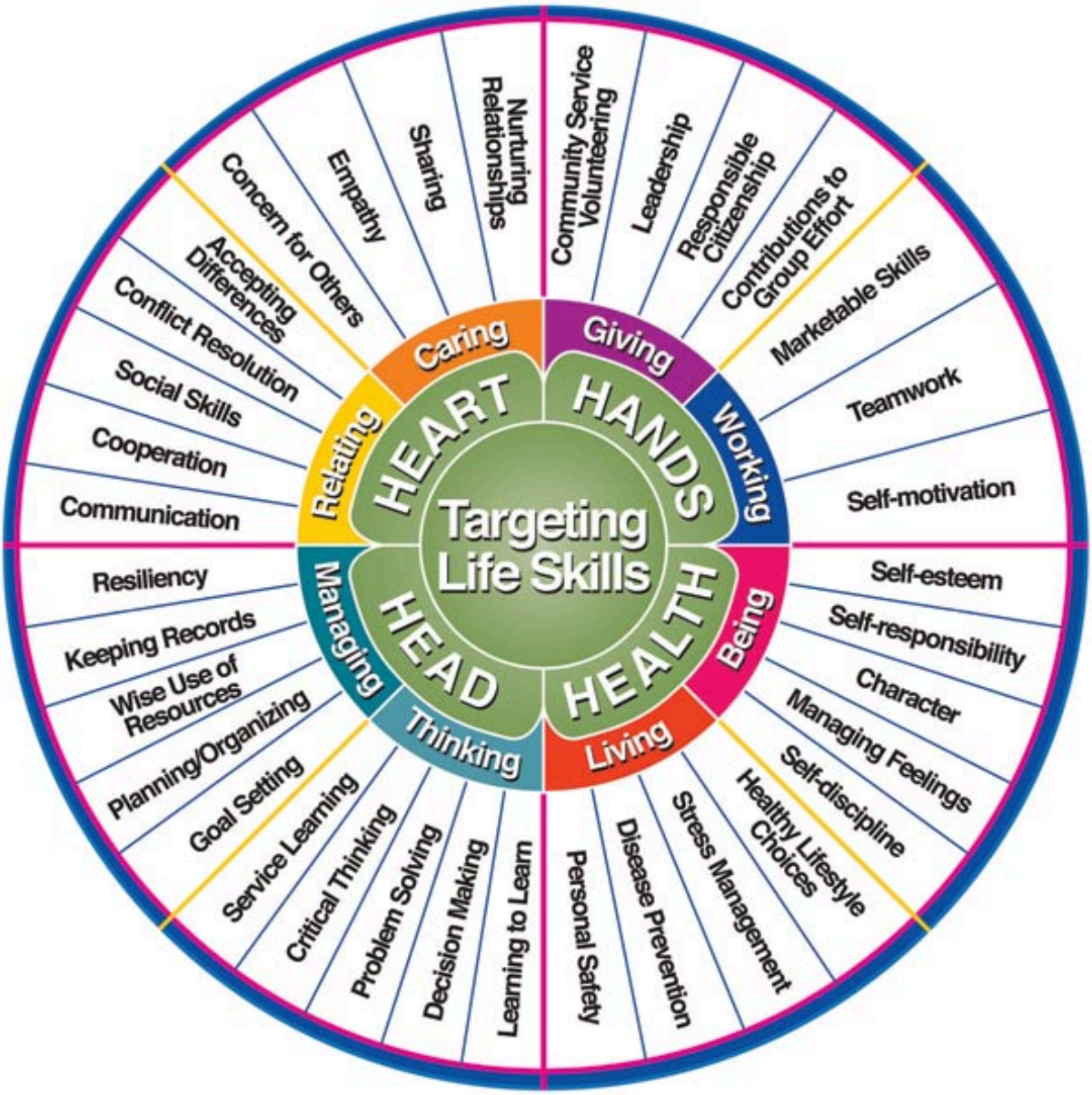


Image: Hendricks, P. (1998) "Developing Youth Curriculum Using the Targeting Life Skills Model" http://www.extension.iastate.edu/4H/skls.eval.htm

Targeting Life Skills

A skill is a learned ability. Life skills are those abilities that assist individuals to lead successful, productive, and satisfying lives. In 4-H, we use the Targeting Life Skills Model to help youth become competent and prepared for adulthood. The Targeting Life Skills Model categories are based on the four H's from the 4-H clover (Head, Heart, Hands, and Health). Under each of these main categories, there are four categories and eight subcategories listing specific skills youth learn in 4-H. The main goal in 4-H positive youth development is to provide developmentally appropriate opportunities for youth to experience life skills and to be able to use them throughout a lifetime. By understanding the importance of the 4-H framework and its structure, 4-H members, parents, professionals, and leaders will know the expectations and will be able to effectively use 4-H delivery methods to help youth learn these life skills.

National Standards for Art Education

National Art Education Association standards were originally developed in 1994 and were updated in 2014. Visual Arts Anchor Standards provide 4-H Ceramics essential questions and standards for all grade levels. Visit https://nationalartsstandards.org/ to see the standards for each category and grade level. Many can be applied to each unit in the 4-H Ceramics Manual.

Creating

- Anchor Standard 1: Generate and conceptualize artistic ideas and work.
- Anchor Standard 2: Organize and develop artistic ideas and work.
- Anchor Standard 3: Refine and complete artistic work.

Presenting

- Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.
- Anchor Standard 5: Develop and refine artistic techniques and work for presentation.
- Anchor Standard 6: Convey meaning through the presentation of artistic work.

Responding

- Anchor Standard 7: Perceive and analyze artistic work.
- Anchor Standard 8: Interpret intent and meaning in artistic work.
- Anchor Standard 9: Apply criteria to evaluate artistic work.

Connecting

- Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.
- Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding

Fun with Ceramics - History

Learning about the history of ceramics is just as important as making pottery today. Ceramics go back to prehistoric times. After people discovered fire, they started experimenting with clay and found they could make it hard by heating it. From that point, clay became a material with endless possibilities.

Ceramic Fragment,14th–15th century, Earthenware; incised decoration through a white slip and coloring under transparent glaze, Courtesy of The Metropolitan Museum of Art, New York, https://www.metmuseum.org/art/collection/search/445159

Early ceramics were very simple. People shaped clay by pinching and rolling it into bowls, plates, and tools. They fired these pieces in fire pits at low temperatures. Over time, people learned that fire changed clay in amazing ways. They worked to make pottery stronger and less porous by smoothing and polishing the outside. Many pieces from these early times were everyday tools or religious items with simple decorations.

Pottery is one of the few art forms that shows history from all over the world. It tells the story of how people lived, worked, and created.

Ceramics in the Western World

Pottery in the Western World has a long history. It started in Mesopotamia around 5000–3000 BC. People there made bricks and tiles for buildings and farming. They also invented the pottery wheel, which changed ceramics forever.

In Egypt, pottery became more decorative. Egyptians made sculptures, religious statues, and vessels using the pottery wheel. They created colorful glazes called Egyptian paste, known for turquoise and copper colors. They also used iron oxides to paint pictures and hieroglyphs on pottery.

In the Mediterranean, people built kilns to fire pottery at higher temperatures. This made pieces stronger and better quality. They also improved how they used the pottery wheel.

In the Americas (around 800–1200 AD), early pottery was mostly hand-built with coils. Pieces were thin and often had geometric designs. In the Southwest United States, handled jugs were common. Central and South American potters made beautiful pieces that looked like nature. They painted animals and plants with bright colors on red clay.

Jar from the tomb of Sennedjem, Dynasty 19, Painted red pottery, Courtesy of The Metropolitan Museum of Art, New York, https://www.metmuseum.org/art/collection/search/544702

Ceramics in the Eastern World

Pottery in the Eastern World is known for its elegance and prestige that is separate from the rest of the world's historical ceramic lineage. Pottery dates all the way back to 3500 BC in China where it was often used for religious ceremonies such as funerals, with black colored clay, and mostly smooth cylindrical shaped pieces. Ceramic practices spread to Japan around 2000 BC, then on to Korea around the 1st century and later in Arabia by the 12th century.

Eastern pottery is considered some of the most refined in the world. Eastern Asian pottery was mastered through intense practices in the houses of monks and by other passionate artistic craftsmen. Japan produced the breathtaking and world renowned terracotta soldiers, developed mold making works, and produced exquisite sculptures from its region. The refined practices with porcelain developed the art of making tea pots which supported the sacred tea ceremony practice within its culture. Around the 16th century, Japan birthed the Raku process which has now become a world wide favorite in ceramics studies due to its unpredictable nature in the glazes and high intensity firing process. The ornate and delicate decorations found in Arabian and Persian pottery have strong eastern Asian pottery influences as well.

Foliated plate with rocks, plants, and melons, 14th century, Porcelain painted in underglaze cobalt blue (Jingdezhen ware, Courtesy of The Metropolitan Museum of Art, New York, https://www.metmuseum.org/art/collection/search/42495

Popular Through the Centuries

The art of ceramics can be traced throughout history and can be found in nearly every point of time since the discovery of fire. Ceramics is one of the oldest art forms. It has been used for cooking, building, and religious ceremonies in every culture. Even today, pottery connects us to the past. When you work with clay, you are part of a tradition that is thousands of years old.

As a 4-H member, you get to use modern tools like electric and gas kilns. These help control temperature so you can try different clays, glazes, and colors. In this project, you will learn skills developed over centuries. As you learn, help others too! Teaching others makes you a leader and keeps the tradition of creating beauty from clay alive—whether for everyday use or as fine art.

Ceramics Units

The 4-H Ceramic project units are divided by skills you can learn, beginning with working with clay, then moving into various types of glazes using either clay objects you have made or purchased, and finishing with sculpture and throwing on a potter's wheel.

It is suggested (not required) to do Units 1 and 2 in order. Units 3 through 6 may be taken in any order based on the member's interests. Members may exhibit in more than one unit, provided the member is enrolled in and has completed the requirements of each of the units they are exhibiting in. It is suggested (not required) to do Units 7 through 9 after completing Units 1 or 2 and any of the glaze units. Units may be repeated with different exhibit item(s) to learn and master new skills in a particular area. All work must be done by the 4-H member, including the cleaning of greenware where applicable.

One piece consists of no more than one item with a lid. More than one piece is considered a set. Pieces in a set must be related. All ceramic pieces that are exhibited must be free for close inspection by the judge **(i.e., flowers should not be fastened with floral clay in a flowerpot**). If not, the piece/pieces will be disqualified. The entry card should be attached in a way to allow the judge to inspect all parts of the item (i.e., tied or taped on with a string).

If the exhibit item is purchased bisqueware or greenware, it should already be cleaned and fired before judging and can be exhibited in Unit 3 through Unit 6. For Unit 3 through Unit 6, purchased items and hand constructed items will be judged in separate classes.

Ceramics Units

Exhibit requirements may change year to year, so be sure to check the State 4-H Website as you are deciding which unit to complete. The Ceramic project units are:

Hand-Constructed Unit 1

Includes hand-constructed items using earthenware and stoneware. Members learn the basics of hand-construction skills by creating a pinch pot, a drape shape or sagged shape exhibit and completing the learning activities.

Slab and Coil Constructed Unit 2

Includes hand-constructed items using earthenware and stoneware. Members learn to slab or coil hand-construction methods by creating a slab or coil exhibit piece and completing the learning activities.

Underglazes Unit 3

Includes underglazes on earthenware, stoneware, and porcelain. Members learn underglaze techniques by creating one exhibit piece that is between 4" in width or height and 12" in width or height and completing the learning activities.

Unfired Finishes Unit 4

Includes underglazes on earthenware, stoneware, and porcelain. Members learn unfired finish techniques by creating one exhibit piece that is between 4" in width or height and 12" in width or height and completing the learning activities.

Glazes Unit 5

Includes underglazes on earthenware, stoneware, and porcelain. Members learn basic reactive glaze techniques by creating one exhibit piece that is between 4" in width or height and 12" in width or height and completing the learning activities.

Ceramics Units

Overglazes Unit 6

Includes underglazes on earthenware, stoneware, and porcelain. Members learn overglaze techniques by creating one exhibit piece that is between 4" in width or height and 12" in width or height and completing the learning activities.

Sculpture Unit 7

Includes underglazes on earthenware and stoneware. Members learn glazed sculpture techniques by creating one exhibit piece meant to be hung and completing the learning activities.

Wheel Throwing Unit 8

Includes wheel-thrown items using earthenware and stoneware. Members learn wheel throwing techniques by creating a set of two matching functional glazed pieces of equal height, width and shape and completing the learning activities.

Production Mold Unit 9

Members learn production mold techniques utilizing porcelain slip by completing a set of three to five articles using a slipcasting mold showing consistency in production and completing the learning activities. Members learn entrepreneurial skills by creating a business plan for selling items they have made using production molds.

Consult the Exhibit Requirements and Ceramics judging score sheets on the State 4-H Website at https://co4h.colostate.edu/colorado-4-h-state-fair/

Records

A completed Ceramics e-Record presented in a sturdy binder/notebook must be entered with the exhibit piece. Include two completed learning activity projects with information listed on the Ceramics Activities Page.

Include the Ceramics Technique Page with at least three projects listed that you completed for the unit this year. The technique page should have enough information included so the exhibitor or other people would be able to make a project very similar by following the instructions. You should have a technique page with each piece you exhibit. The technique page should include:

1. A list of all tools and brushes used. Sizes should be included, if applicable.
2. A list of brand names, numbers, and colors used.
3. A list of steps.
    - A. If the piece was bisque-fired before application of color and to what cone size or temperature.
    - B. How the color/colors were applied and number of coats. The cone size or temperature the color/colors were fired.
    - C. A list of other products used.

Points to Remember

Choose greenware with sharp detail for proper thickness.

The ceramic clay body must be fired at a proper temperature to ensure proper maturity.

Read all labels on all containers for important information and instructions.

Follow instructions closely.

Follow the safety rules to prevent any health hazards and/or complications with your project.

Keep accurate and neat notes to enter into your Ceramics e-record supplement sheets.

Any unit may be repeated with new skills learned.

The unit criteria, for the unit in which you were enrolled, must be met.

More than one unit may be completed in one 4-H year.

The Ceramics e-records must be completed per unit.

Be creative! Have fun!

Safety Rules

Do not have food and/or drink at your work area.

Keep your hands away from your mouth and eyes.

Do not blow clay dust from the ceramic piece, use a damp sponge or rag to wipe a piece clean.

Be sure your hands are clean before handling your piece.

Protect Your Lungs: Clay dust can be harmful if inhaled. Always clean up carefully and avoid creating dust.

Always work in a well ventilated room when you are working with overglazes.

Wear an N91 fine particle mask when dealing with any dry mix materials or in situations where you're dealing with heavy dust from pottery or its materials.

Wear an apron to protect your clothing.

Use the Kiln Safely: Only trained adults should operate the kiln.

Records

Information that may be included in the story in the record book includes:

- Your name and age
- A little information about yourself
- What you liked most and/or least about doing your projects
- About difficulties you had in doing your projects, if any
- What you have learned about ceramics
- What you would like to learn next year
- What you and/or your club may have done for a community project

A minimum of four pictures are required to show the progress of your project. You should have two pictures showing your two activity pieces and at least two pictures showing your exhibit piece. You can add more photos if you want.

Be consistent (i.e., if you start your record with black pen, continue to use black pen throughout). You may use pen, pencil, or the computer to complete the record book in either a Word document, a fillable PDF, or a Google Doc. E-records for the Ceramics project are available at https://co4h.colostate.edu/creative-arts/.

Resources

Below are some resources you may want to consider as you learn about ceramics.

- **Google your nearest pottery stores/studios near you**

- **CO Pottery Suppliers**:
  Stone Leaf Pottery (Denver, has online purchasing options), Rocky Mountain Clay (Denver, has online purchasing options), Continental Clay Company (Denver, has online purchasing options), Friend Assembly (Aurora, has classes, can fire your pieces, has open studio hours either guided or independent, etc), Northern Colorado Potters Guild (Fort Collins, another studio share style establishment), AlSi Ceramics Studio (Denver, studio share, classes, firing, etc)

- **Online suppliers:**
  https://rockymountainclay.com/
  https://www.dickblick.com/categories/ceramics-sculpture/
  https://www.theceramicshop.com/,
  https://seattlepotterysupply.com/,
  https://www.penguinpottery.com/,
  https://www.pottersshop.com/supplies/

- **Greenware suppliers:** Hobby Hut (Canon City)
  https://hobbyhutceramics.com/,
  Wholesale Bisqueware
  https://www.bisqueimports.com/

YouTube Teachers (Please be sure your parents or guardians approve of you searching for teachers on the internet.):

- **Simon Leach:**
  Resource for beginners

- **Hsinchuen Lin:**
  Technique focused videos

- **Florian Gadsby:**
  Detailed instruction and general learning resources

- **Earth Nation Ceramics:**
  Resource for beginners, offering a playlist that covers the basics of pottery, including wedging, centering, and throwing.

- **The Clay Teacher - Cindy Clarke Pottery:**
  Pottery tutorials, including hand-building and air-dried pottery.

"Vendors are listed as a service to Extension clientele. CSU Extension does not guarantee nor warrant the standard of any vendor's product, nor does it imply approval of the product to the exclusion of others which also may be available, nor does it intend discrimination or criticism of products or providers that are mentioned or not mentioned. In addition, CSU Extension assumes no liability for harvesting or use of vendors' product."

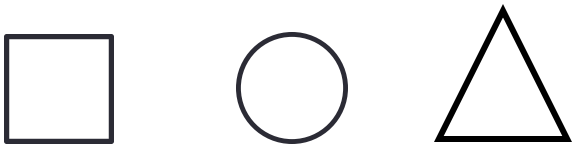
Elements and Principles of Design - Ceramic Specific

In ceramic design, the elements of art (**line, shape, form, space, color, value, and texture**) are the foundational building blocks used to create a project piece. These elements are then organized and manipulated according to the principles of design (**balance, emphasis, movement, pattern, rhythm, unity, variety, proportion and contrast**) to achieve a desired look and to convey artistic intent.

Elements of Design in Ceramics

Line: A mark with length and direction, defining shapes and outlines, and can be used to create texture.

Shape: A two-dimensional area defined by lines or color changes, which in ceramics can be on the surface decoration or in the form of the object.



Form: A three-dimensional object with height, width, and depth, which in ceramics involve the manipulation of form through modeling, carving, or molding.

Space: The area around, between, or within objects, including both positive (occupied) and negative (empty) space, which in ceramics can be seen in terms of the interior and exterior volumes of the object.

Color: The visual response to wavelengths of light, influencing mood and emotional expression, which in ceramics can be used through glazes, slips, the color of the clay, and other surface treatments.

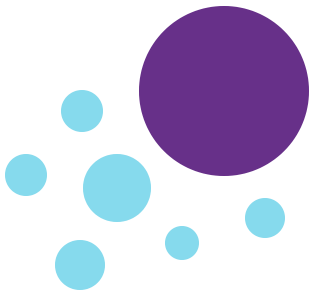
Value: The lightness or darkness of a color, creating contrast and depth, which define the ceramic form through shading and highlighting.

Texture: The surface quality of the ceramic piece, either tactile (felt) or visual (implied), which in ceramics can be explored through surface treatments like carving, incising, adding relief or glazing.

Principles of Design in Ceramics

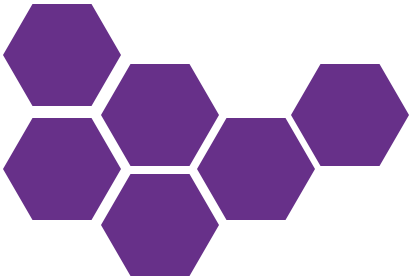
Balance:
The distribution of visual weight within the piece, achieving stability, which in ceramics can be achieved through symmetrical or asymmetrical arrangement of forms and design elements.

Emphasis:
Drawing attention to a specific area or focal point, which in ceramics can be achieved through variations in texture, color, form, or scale to draw attention to specific areas of the object.



Movement:
Guiding the viewer's eye through the piece, often towards the focal point, which can be suggested through the flow of lines or patterns on the surface.

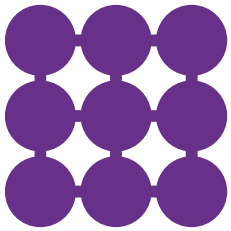
Pattern:
The repetition of elements to create a decorative effect through surface decoration or structural repetition.



Rhythm:
The organized movement or flow created by the repetition of elements.

Principles of Design in Ceramics

Unity:
The harmonious relationship between all elements, creating a sense of wholeness, which can be achieved through the consistent application of design elements throughout the piece.



Variety:
Using diverse elements to add visual interest and prevent monotony.

Proportion:
The relationship between the sizes of different parts of the ceramic piece, which is essential for creating a sense of harmony and balance in the overall composition.

Contrast:
The juxtaposition of opposing elements to create visual impact, achieved through variations in texture, color, form, or scale.

Reference:
https://human.libretexts.org/Workbench/Ceramics/10%3A_Design_and_Aesthetics/10.01%3A_Principles_of_Ceramic_Design

Sketching Your Design Ahead of Time

It is helpful to draw out design ideas before you start working with your clay, so you have an idea of what you want to make. This will help you think creatively before gathering all the supplies you will need. Get some drawing paper and a pencil, marker, or crayons and draw some ideas for your design.

Color Wheel Exercise

Before beginning your projects, try your skill at mixing colors. Having knowledge of "color mixing" is very important. You will be amazed at what you can achieve.

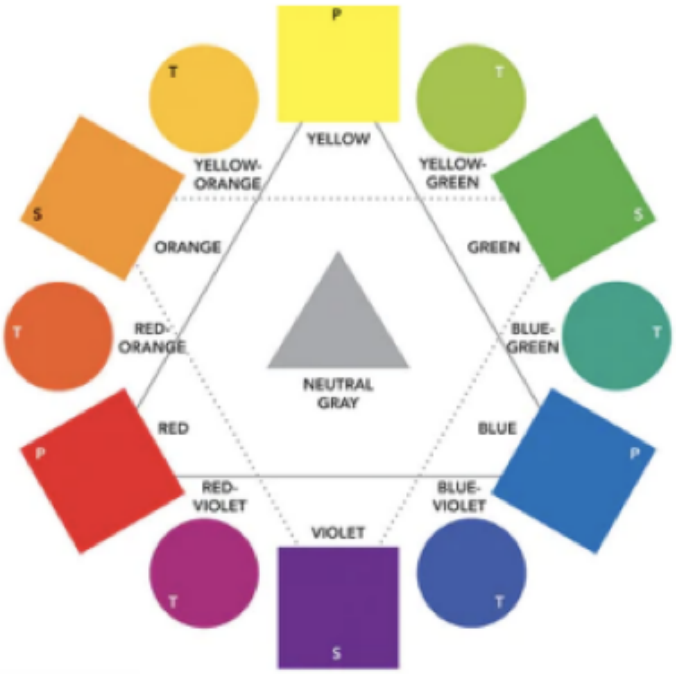
Colors you will need:

- The primary colors (yellow, red, and blue)
- Black and white

Directions:

1. Draw a large circle, the size of a saucer, on a smooth side of butcher paper. Inside the large circle, draw twelve circles that are the size of a nickel. Number the circles as if you were making a clock dial.
2. Draw a solid line, making an equilateral triangle, connecting 12 (yellow)-4 (red) and 8 (blue).
3. Draw another equilateral triangle, this time with broken lines, connecting 2 (orange)- 6 (violet) and 10 (green). Your drawing should look similar to the color wheel below.

Paint yellow in the 12 o'clock square. Blue in the 4 o'clock square and red in the 8 o'clock square. Be sure to wash the paint knife and brush well between each color.



Primary Colors:

Yellow Red Blue

(They are the strongest colors.)

Secondary Colors:

Orange Violet Green

(Secondary colors are a combination of two primary colors).

Mixing Secondary Colors

Mix an equal amount of yellow and red, with a paint knife, on a piece of foil or on a plastic lid. Did you get an orange? Great!! Paint the orange in the 11 o'clock square. Save the left over orange paint.

Mix an equal amount of red and blue. You made a violet. Paint the violet in the 6 o'clock square. Save the left over violet paint.

Mix an equal amount of blue and yellow. Did you get a green? Fantastic! Paint the green in the 2 o'clock square. Save the left over green paint.

Mixing Intermediate Colors

Yellow-Orange, Red-Orange, Red-Violet, Blue-Violet, Blue-Green, Yellow-Green (these are made by mixing a secondary color with an adjacent primary color). Always mix a small amount of the dark color into the light color until you achieve the desired color.

Mix orange into the yellow until you have a nice yellow-orange color. Paint this color in the 11 o'clock circle.

Mix red into the orange until you have a nice red-orange color. Paint this color in the 9 o'clock circle.

Mix red into violet until you have a nice red-violet color. Paint this color in the 7 o'clock circle.

Mix blue into the violet until you have a nice blue-violet color. Paint this color in the 5 o'clock circle.

Mix blue into the green until you have a nice blue-green color. Paint this color in the 3 o'clock circle.

Mix green into the yellow until you have a nice yellow-green color. Paint this color in the 1 o'clock circle.

The placement of the colors should be the same as shown on the color wheel on the previous page. Save your color wheel for future references.

Color Wheel Exercise Worksheet

What color did you get when you mixed green and violet?

What color did you get when you mixed violet and orange?

What color did you get when you mixed orange and green?

The colors you obtained by mixing the secondary colors above are called Tertiary colors.
What color did you get when you mixed blue and white?

What color did you get when you mixed red and white?

What color did you get when you mixed green and white?

Color Wheel Exercise Worksheet

The colors you obtained by mixing white with the darker colors are called shades and tints.

A project that is done in several shades of one color is known as a Monochromatic color scheme (pale blue, sky blue, baby blue, etc.)

What color did you get when you mixed blue and black?

You can obtain darker shades of colors when you mix black or brown with your colors. These are excellent colors for shadowing. The exception to the rule would be mixing black with yellow.

What color did you get when you mixed black into yellow?

A darker shade of yellow can be obtained by using brown.

What color did you get when you mixed red, orange, and green?

What color did you get when you mixed yellow and violet?

If you decide to mix colors to paint your piece, be sure to mix enough of the color that you will need for that particular area. Some mixed colors may vary in color if the exact formula is not followed.

Remember that all colors will work well together if you watch the placement, using the five basic color schemes. Your pieces will be more interesting if the amounts of colors are unequal. (Rhodes, 2000, page. 94)

Fun with Ceramics - Introduction to Terms

What is a clay body?
A clay body is a mixture of clay or clays and other earthly mineral substances which are blended together to achieve a specific ceramic purpose. (Rhodes, 2000, page. 94) Clay comes from the earth, it is rocks and minerals that have broken down into a mud-like consistency, collected, sifted of small particles, partially dehydrated then formed into large clumps of moldable, workable clay.

There are several Clay Body Classifications. The three most common clay bodies produced are Earthenware, Stoneware, and Porcelain. Each are determined by the type of clay body make up and temperature levels they are fired to.

What is greenware?
Greenware is simply unfired or “raw” pottery, a clay body that has been shaped into something but has not been fired yet. The stages of Greenware include: Plastic (moldable) Clay, Leather Hard Clay, and Bone Dry Clay

What is bisqueware?
Bisqueware is clay that has been fired once at a low temp to remove all moisture out of it to prepare it for glazing.

What are different uses of pottery?
There are primarily two uses of pottery: functional and non-functional. Functional pottery is pottery you can use everyday such as bowls, plates, cups, etc. Non-Functional pottery serves as decorative art pieces with interpretations subject to the viewer and or the cultural or contextual references presented by the artist.

What are different styles of pottery?
This project will introduce you to several different styles of pottery including: Pinching, Hand Building - Slab or Coil, Wheel Throwing, and Casting.

What are glazes and glaze types?
Ceramic glazes are glassy coatings applied to bisque-fired pottery used for waterproofing, decoration, durability, and functionality. Their composition is made from finely ground minerals and other materials, often including silica, alumina, and fluxes, which lower the melting point of the glaze allowing it to fuse to the clay at kiln temperatures. Glazes also include colorants, metal oxides or stains added to achieve different colors.

There are several glaze types:

- **Engobes or slips** - clay-based mixtures used to change the surface color or texture
- **Underglazes** - glazes applied to the surface to decorate the pottery before applying a transparent glaze over it, creating a design that appears beneath the glaze
- **Ash glazes** - made from wood or plant ash
- **Overglazes** - decorations applied over a fired and glazed surface and then fired again at a lower temperature to fuse the colors onto the glaze
- **Oxides or Stains** - oxides are raw pigments and stains are manufactured powders used to create specific colors
- **Crystalline (glass)** - a glaze mixed with zinc silicate crystals, which form in the glaze during the kiln firing process

Glazes can be either glossy (shiny) or matte (non-reflective).

What does it mean to "fire" ceramics?
In ceramics, firing means heating clay and glazes in a kiln to a high temperature, which causes the clay particles to fuse together and the glazes to melt and form a durable, permanent surface. There are two ways of firing clay with either a kiln or a pit.

What are different types of firing?
Bisque firing is a crucial step in pottery that transforms clay into a durable, porous form. It involves heating the clay to a specific temperature, typically between 1650-1940°F (900-1060°C), to remove moisture and burn out organic matter. This process results in a fired, bisque-ware that is ready for glazes or further decoration.

Oxidation firing is firing with adequate oxygen throughout the firing process. Reduction firing uses a fuel burning kiln with incomplete combustion, an atmosphere with an excess of hot carbon. The excess carbon draws oxygen from metallic oxides in the clay body and glaze chemicals to create carbon monoxide and carbon dioxide which create a change in the glaze colors.

What are firing cones?
Firing cones are different firing temperatures. There are many different cones (temperatures) to fire clay at, and the type of clay determines the temperature cone to fire to.

The term "cone" represents a measurement of temperature over time as well as a measurement of energy.

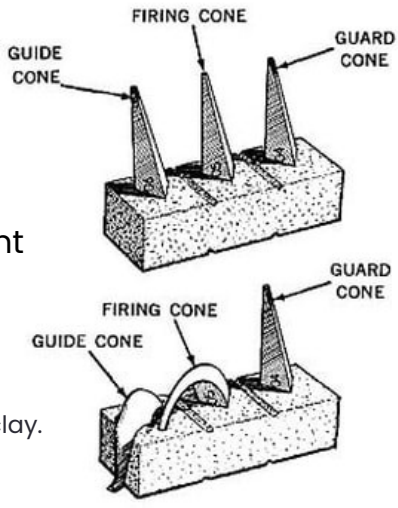


Image source: https://www.armadilloclay.com/articles/cones-explained#/

Basic Tools for Your Pottery Kit

Sponges
Usually of natural origin in many shapes and sizes. Used for moistening clay for throwing, cleaning, and smoothing pieces. An Elephant Ear is a special fine grained sponge ideal for pottery.

Ribs
Also called kidneys, are made of carved hardwood, rubber, and metal. They are used for shaping and refining pieces.

Cutting Wire
Thin wire with wooden handles at each end used to cut clay.

Fettling Knife
A special knife with a long, narrow blade used f mming, carving and slicing cla

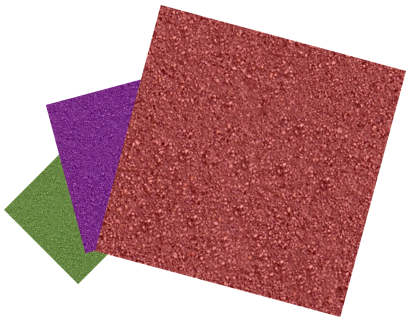
Loop Tools
Made of hardwood with a loop of thin wire or flat metal at either end. They are used for trimming, carving, decorating and many other uses.

I
This tool has a thin needle projecting from one end of a wooden handle, and is used fo mming, decorating, and scorin

Basic Tools for Your Pottery Kit

Apron
Wearing an apron will help protect your clothing from the materials you are working with.

Grit Cloth
Used to finish smoothing seams on greenware.



Detail Brush
Exce 'es, eyel es.

Stiff Bristle Brush
Usec
textu g, and dry b

Rolling Pin Set
Rollers come either smooth or in a variety of textures carved into the wood of the rolling pin that transfers onto the clay. Rolling pins can be used to make slabs for sculpting clay, to adjust the thickness of the clay until it is flat, or for pressing out plaids, stripes, or other patterns and textures.

Glaze Brushes
Used to apply glaze and underglazes (if applying underglaze to a large area) with precision and accuracy

Translucent Brush
For application of oil-based translucents. It can also be used for dry brushing oil-bas s as well as used for chalk

Brushes

Brushes are instruments made from natural animal hair, or man-made synthetic fibers like nylon. Most hair or bristles are bound together and fastened into a metal ferrule.

Camel Hair:
These brushes can be made up from many different animals. The best camel hair brush is made up from the hair of squirrels. The camel hair brushes are generally soft and are mostly used for the application of glazes and lustres. They are highly recommended for lustres because they allow these media to flow smoothly, without leaving apparent brush marks.

Red Sable:
This type of brush is made from any one of the Asiatic mink or weasel hairs. They are one of the finest brushes and valued for brush work. Red sable brushes are strong, springy and have fine points.

Russian Sable:
The hairs are made up of the spotted American skunk and other polecats. It is sometimes referred to as a "fitch."

Bristle:
Bristle brushes are made from a boar's or hog's body hairs. The finest quality bristles come from the hog's neck, which taper to a split end of several fine filaments.

Glaze Brush:
This brush comes in camel hair, red sable, ox hair, and nylon. The sizes run from 1/4" to 1-1/2". Nylon is recommended for satin and matt glazes because it applies these non-moving glazes smoothly.

Fan brush:
They come in various sizes and are highly recommended for crystal type of glazes. Crystals have a tendency to go into the ferrule of the other brushes. It is very hard to determine if the crystals are completely out of the ferrule when the brush is cleaned. These crystals may slip out when another color is used. This ruins the finish.

Square Shader:
Red sable square shaders are full bodied, sharp-edged, and resilient. They are most valuable for design work.

Sabeline:
This brush is made from the tufts of silken hair found in the ears of cattle. They are strong and pointed, but do not have the ability to retain their shape.

Blenders or Dusting Brush:
These brushes are made from badger hair and are sometimes referred to as a badger brush.

Stiff Bristle:
Mostly used to apply chalks, some oil base colors and to "scrub in" opaque stains.

Brushes

Brushes are manufactured in a round or flat shape and vary in bristle length and fullness. They are made in several sizes.

To ensure a long life for your brushes thoroughly clean them, then shape and let them dry flat on a paper towel. Brushes that need to be cleaned in a turpentine base or other solvent cleaner, must always be cleaned with soap and water as a final cleaning. A brush should never be jammed against the bottom of a container.

Never leave your brush in the cleaning water. The water will travel up the bristles onto the wooden handle and cause the finish to peel from the handle. It will also cause the brush to become deformed, and it rarely will take shape again. If the brush is severely misshapen, after it is totally cleaned, shape it using styling hair gel. Then wrap it in foil and place it in the freezer for a few days.

It is important not to loan your brushes to others. Brushes used for brushstroke work form to your way of making brushstrokes. There is a possibility they might be returned improperly cleaned, which shortens the life of a brush.

When storing your brushes for any length of time, place a mothball with them. This prevents tiny insects from eating the glue in the ferrule, which will cause a loss of the brush hair. With proper care, the brushes will last almost indefinitely.

Types of Clay

A clay body is a combination of clay particles and ceramic materials mixed together to a workable consistency that produces predictable firing results. Some clay bodies can be found in nature. The state of Georgia, for example, is known for its red clay. Other clay bodies are made from dry powder materials and mixed with water to create the clay.

Earthenware

Earthenware is a white low-fire clay body (fired between 1728-1945 degrees Fahrenheit). Some earthenware holds iron oxide which can give it a reddish-brown color like in terra cotta flower pots. It is still porous after firing and must be sealed. Though not as durable as stoneware or porcelain, it can be used for dinnerware and ornamental pieces. Low-fired clay dinnerware has a greater tendency to chip and is less expensive. Earthenware can be hand-molded and thrown on a wheel, but is most popular in casted greenware. It will serve you well in all units and skills.

Porcelain

Porcelain is referred to as the "Grand Lady" of all the clay bodies and is the most expensive. (Typically porcelain is fired between 2381-2455 degrees Farenheit.) It is most delicate in greenware, but is highly chip resistant when fired to cone 6. Because it is a vitreous clay, it does not have to be sealed with glaze, but for sanitary reasons all dinnerware and food containers should be glazed with food-safe glazes. A glazed piece of porcelain is called china and is decorated most often with an overglaze. Porcelain comes in many colors and for most techniques, the white and pastel tones are translucent and the dark colors opaque.

Stoneware

Stoneware is a high-fired and chip resistant clay body (fired between 2100-2400 degrees Fahrenheit). Because of its strength, it is most popular in dinnerware, but is also used for many ornamental pieces. If stoneware is fired to proper temperature, it is vitreous (will hold water) and does not need a glaze to seal its clay. Fired clay is vitreous when particles fuse together and become glass-like. Since it is hard to tell if it has been fired to the right temperature, all dinnerware, food, and drink containers must be glazed with food-safe glazes. Stoneware is the easiest kind of standard clay to work with and is mostly hand

formed and thrown on a wheel; however, it is also made in slip form which can be used in casted greenware. Most ceramists do not use unfired finishes on stoneware, since it is more expensive.

Other types of clay you might want to research include:
Kaolin, Ball Clays, Fire Clays, Bentonite Clays, Fluxes, Fillers, Paper Clays, Polymer Clays, Air-Dry Clays

How to Clean Greenware

1. Your greenware piece must be bone dry. Wet or damp greenware can become polished which will repeal ceramic products. With the straight edge blade of the cleaning tool, gently scrape diagonally across the seam line. The seam line should be removed to follow the natural shape of the piece. Use the curved end of the tool to clean the indented and rounded areas.

2. Brush away accumulated clay dust with a soft dusting brush. Do not blow the dust.

3. Smooth the scratch marks made by the cleaning tool, and any surface imperfections with a medium grade grit cloth. Use a circular motion, again, following the natural shape of the piece. You do not want to create flat areas. Remove accumulated dust with the dusting brush.

4. Replace damaged detail with the curved end of the cleaning or a stylus tool. These lines will be sharp in contrast to the surrounding area. With water, dampen a soft brush, soften the harsh lines.

5. Container walls must be of even thickness. Reduce the thicker areas from the inside of the opening with a medium grade grit cloth. Be gentle! To level the top edge of the opening, gently rotate the inverted object in a circular pattern on a piece of fine screen. The bottom of the piece may also be leveled in this manor. Be careful not to squeeze. Remove any clay drips from the inside of the container.

6. Prepare a cup of tepid water with one teaspoon of vinegar. Vinegar water should eliminate hard spots that may appear. A hard spot is caused by a chemical build up in the mold that was used. The vinegar solution makes the greenware more porous. With a natural or synthetic wet sponge, lightly wipe over the piece one time. If more corrections are needed, let the piece dry and repeat steps.

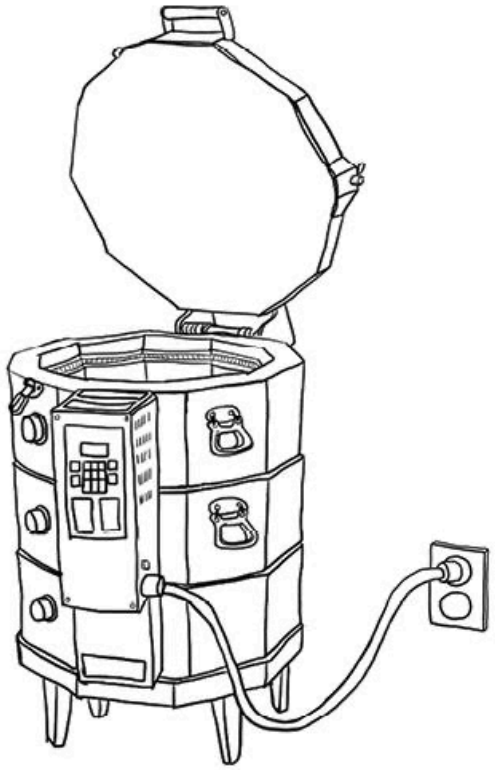
Firing with a Kiln

Typically ceramics are fired in two stages. The first stage is known as the bisque firing and the second stage is known as the glaze firing. The bisque firing process needs to be done under a very controlled heat, as the cleaned greenware (air dried clay) is put in a kiln and heated slowly and then also cooled slowly. When greenware is fired, the moisture is removed and becomes a hard form called bisqueware. During firing, bisqueware goes through a chemical change to become ceramic. This enables the pottery to become porous and able to handle water-based paints without it cracking or failing. The finished piece also becomes stronger, and a harder ceramic with better porosity is perfectly prepared for the application of glazes.

The second stage, called glaze firing, is done after the potter has applied paints, underglazes and glazes to the piece. This is a more drawn out process than bisque firing, depending on the cone temperature that you choose to fire to.

If you have your own kiln, read the directions and have a parent help you. Kilns come in different sizes and have specific directions that must be followed in order to be safe. Some Ceramics leaders may have their own kilns and can fire for you, or you can have your firing done at a local ceramics store or studio. Each kiln fires differently. The kiln operator often keeps a log to determine how to fire and how to arrange the pieces in the kiln for the best results. Kiln temperature is usually more intense near the top. Some colors of glazes "travel" while being fired. These pieces need to be fired on the top shelf. Floating or traveling flecks of glaze will float upwards and attach themselves to other glazes if they are fired on the lower shelves

Electric kiln temperatures range from approximately 1100 degrees to 2700 degrees Fahrenheit. Each technique may require a different firing temperature.



Kiln image from https://ceramicartsnetwork.org/ceramics-monthly/ceramics-monthly-article/tips-and-tools-kiln-care

Cone Charts

Your leader may show you a Pyrometric Cone Chart that will show you the most recommended firing ranges. You will low fire for the bisque to be stained or for glaze. The Orton Cone Chart is a reference guide developed in the 1890s used in ceramics to show the relationship between pyrometric cones and the temperatures they represent in a kiln.

Here's what it means in simple terms:

Pyrometric cones are small, cone-shaped pieces made of ceramic materials that bend at specific temperatures. They help potters know when their kiln has reached the right heat for firing clay and glazes.

Each cone has a number (like Cone 06, Cone 6, Cone 10). Lower numbers usually mean lower temperatures, and higher numbers mean hotter temperatures.

The Orton Cone Chart lists these cone numbers along with their corresponding temperatures in both Fahrenheit and Celsius. It also shows whether the cone is for low-fire, mid-fire, or high-fire ranges.
Why is it important?

- It helps potters choose the right cone for their clay and glaze.
- It ensures pieces are fired correctly so they don't crack, melt, or stay too soft.

Cone Charts

Cone	Equivalent Cone Temperature at 27°F/Hour Heating Rate at End of Firing	Equivalent Cone Temperature at 108°F/Hour Heating Rate at End of Firing	Equivalent Cone Temperature at 270°F/Hour Heating Rate at End of Firing
022		1087°F - 586°C	1094°F - 590°C
021		1112°F - 600°C	1143°F - 617°C
020		1159°F - 626°C	1180°F - 638°C
019	1213°F - 656°C	1252°F - 678°C	1283°F - 695°C
018	1267°F - 686°C	1319°F - 715°C	1353°F - 734°C
017	1301°F - 705°C	1360°F - 738°C	1405°F - 763°C
016	1368°F - 742°C	1422°F - 772°C	1465°F - 796°C
015	1382°F - 750°C	1456°F - 791°C	1504°F - 818°C
014	1395°F - 757°C	1485°F - 807°C	1540°F - 838°C
013	1485°F - 807°C	1539°F - 837°C	1582°F - 861°C
012	1549°F - 843°C	1582°F - 861°C	1620°F - 882°C
011	1575°F - 857°C	1607°F - 875°C	1641°F - 894°C
010	1636°F - 891°C	1657°F - 903°C	1679°F - 915°C
09	1665°F - 907°C	1688°F - 920°C	1706°F - 930°C
08	1692°F - 922°C	1728°F - 942°C	1753°F - 956°C
07	1764°F - 962°C	1789°F - 976°C	1809°F - 987°C
06	1798°F - 981°C	1828°F - 998°C	1855°F - 1013°C
05-1/2	1839°F - 1004°C	1859°F -1015°C	1877°F - 1025°C
05	1870°F - 1021°C	1888°F - 1031°C	1911°F - 1044°C
04	1915°F - 1046°C	1945°F - 1063°C	1971°F - 1077°C
03	1960°F - 1071°C	1987°F - 1086°C	2019°F - 1104°C
02	1972°F - 1078°C	2016°F - 1102°C	2052°F - 1122°C
01	1999°F - 1093°C	2046°F - 1119°C	2080°F - 1138°C
1	2028°F - 1109°C	2079°F - 1137°C	2109°F - 1154°C
2	2034°F - 1112°C	2088°F - 1142°C	2127°F - 1164°C
3	2039°F - 1115°C	2106°F - 1152°C	2138°F - 1170°C
4	2086°F - 1141°C	2124°F - 1162°C	2161°F - 1183°C
5	2118°F - 1159°C	2167°F - 1186°C	2205°F - 1207°C
5-1/2	2133°F - 1167°C	2197°F - 1203°C	2237°F - 1225°C
6	2165°F - 1185°C	2232°F - 1222°C	2269°F - 1243°C
7	2194°F - 1201°C	2262°F - 1239°C	2295°F - 1257°C
8	2212°F - 1211°C	2280°F - 1249°C	2320°F - 1271°C
9	2235°F - 1224°C	2300°F - 1260°C	2336°F - 1280°C
10	2284°F - 1251°C	2345°F - 1285°C	2381°F - 1305°C

Chart from Soul Ceramics
https://www.soulceramics.com/pages/what-is-a-cone-a-guide-to-pyrometric-cones-and-kilns"

Bisque Firing

Bisque firing is the first, lower-temperature firing of unfired clay (greenware) that transforms it into a durable, hardened, porous ceramic called bisqueware. This crucial step removes remaining moisture, drives off organic materials, and creates a porous surface perfect for absorbing glaze during the next, higher-temperature glaze firing. The bisque-fired piece is now sturdy enough to handle without it breaking, but still porous enough to receive glaze evenly.

The ideal kiln temperature range is usually between cone 06 to cone 04, regardless of clay and glaze temperature. There are reasons why you might choose to fire at one temperature as opposed to another, for example:

- Firing at cone 06 causes the clay to shrink and become porous and therefore will easily accept glaze.
- Firing to cone 04 increases the pottery's strength and durability.

Generally, a higher bisque firing temperature will result in a less porous ceramic.

The purpose of bisque firing is to:

- Harden the clay into ceramic, as well as making it porous and therefore suitable for glazing
- Ensure that the paints, glazes and/or underglazes bond well to the ceramic surface
- Remove any residual moisture to ensure that the finished piece is strong and can withstand further processes
- Ensure that the ceramic piece doesn't fall apart or crack

Loading a Kiln

Before loading or unloading the kiln all switches must be in the OFF position(s) and power to the kiln disconnected. Contact with heating elements or other electrically conductive components within the kiln can result in electrical shock causing injury or death. Before loading or unloading the kiln should be cool, 135°F (57°C) or less to prevent burn injury.

Begin by placing 3 to 4 posts on the kiln floor. These posts will support a shelf and it's best to use ½" to 1" for this purpose. These posts allow for proper air and heat circulation throughout the kiln and to help prevent serious damage to the kiln floor in the case of an overfire.

Loading a Kiln

Place a shelf on the floor posts, placing carefully to avoid contact with the kiln walls, thermocouple (temperature sensor) or Kiln Sitter tube assembly. Check for stability and reposition posts or add more posts if necessary.

Place your ware on the bottom shelf. All ware that is placed in the kiln must be dry. Ware that is not completely dry may crack or explode causing damage to other ware, heating elements, firebrick or Kiln Sitter tube assembly. Slipcast greenware may be fired from several days to one week after pouring. Hand modeled pieces need more drying time, as much as a few weeks. Glazed pieces can typically be fired six hours after application. Consult with your materials supplier for guidance on proper drying time and procedures.

Most ceramic firings use multiple shelf layers separated by posts. To form additional shelf levels choose posts that are about ½" to 1" taller than any ware placed on the proceeding shelf. Use a minimum of three posts, with four being preferred. Once posts are chosen, place them on a shelf and check for stability and readjust or add more posts as necessary. Place your ware on the consecutive shelves.

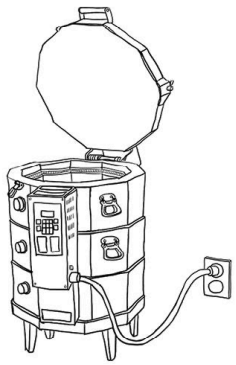
When placing posts, shelves and ware in the kiln, place them at least 1" (more is better) away from thermocouple(s) and Kiln Sitter tube assemblies. These components respond to temperature and you'll want to give them room to operate.

Repeat loading procedure for all remaining shelf levels. When loading is complete make sure that the lid or door will close without making contact with ware, posts or shelves. There should be at least 1" between all kiln ware and the lid or door. The kiln is now loaded and ready to be fired!

Kiln Safety

Students and instructors must read and understand all the safety information that came with the kiln. And a kiln's heat isn't the only safety concern: toxic gases are often released during fuel-burning (carbon dioxide), when firing soluble metal salts (sulfur dioxide), and during reduction firing (carbon monoxide). Overexposure to these volatiles can lead to blood oxygen levels falling, a rise in blood pressure, lung irritation, and in the case of carbon monoxide, drowsiness, fatigue, and even death. The kiln must be properly installed, ventilated, and maintained.

- Make sure the kiln is properly ventilated.
- Turn off and cool the kiln to room temperature to load or unload.
- Do not touch heating elements because of the high voltage. The outside can also get hot while firing. Whenever handling any part of the kiln, kiln mitts or gloves should be worn.
- Do not use extension cords with a kiln.
- Do not leave the kiln unattended while firing and avoid wearing loose or flammable clothing.
- Do not play or allow pets around the kiln while firing.
- Never look into a kiln without safety glasses such as welder's glasses.
- Do not fire with cracked shelves, which could break and damage the inside of the kiln.
- If you smell burning, turn off the kiln and examine the wall outlet/power cord for signs of burning. Unplug your kiln after firing just to be safe.
- Keep the kiln closed when not being used.
- Keep the kiln dry and do not store anything on the lid.
- Do not place objects under or around the kiln (including flammable objects) and keep the area clear from tripping hazards.
- Do not place anything in the kiln you are unsure of. Firing unknown materials is risky.
- Avoid eating and drinking in your work or kiln area, since toxins and dust are easily ingested when you handle food and kiln working materials in the same space.



Guidelines for Judging Your Project

Judges look very closely at the following characteristics of your exhibit piece.

Creativity and Originality
Shows thoughtful design, not just technical assembly.
Unique interpretation of traditional slab/coil methods.
Cohesive artistic voice or theme.

Cleaning
Smooth areas are intentionally smooth; textured areas are cleanly executed.
No unintended tool marks, fingerprints, or smudging.

Construction Quality - This evaluates how well the piece is built.
Structural Integrity

- Walls are even in thickness and appropriate for the form.
- Seams (slab joints, coil joins) are fully blended and secure.
- No cracks, stress fractures, or weak points—especially at joins, handles, rims, and lips.
- The base is level and stable.

Technique Mastery

- Slabs are compressed and joined cleanly; edges are smoothed.
- Coils are consistent and properly blended inside and outside.
- Corners, angles, or curves (if part of the slab form) are crisp or intentionally shaped.
- Attachments are secure

Texture and Design - This evaluates the artistic and functional aspects.
Proportion and Balance

- Form feels visually cohesive and properly weighted.
- The piece stands evenly and is not unintentionally lopsided.
- Pinched and draped or slumped surfaces contribute to the design rather than distract.

Bisque Fired Only
Appropriate for either functional or decorative use
Is the piece strong and sturdy? Check for cracks or areas that might break easily.
Workmanship - This looks at the overall care put into the work.

Attention to Detail

- Edges, rims, and joins are refined.
- Demonstrates skill appropriate for the artist's stated level.

Hand Construction with Stoneware or Earthenware

Unit 1

Project Requirements

Your exhibit will consist of one functional or decorative art piece that is at least 4" in width or height and no larger than 12" in width or height using one of the three techniques listed. **Display items must be bisque fired only - NOT GLAZED.**

- Pinch Pots
- Draped Shape (also known as "Hump Molds" - can be done with coil or slab)
- Sagged Shape (also known as "Slump Molds" - can be done with coil or slab)

Basic Information

Care of Clay

Clay can be stored in air-tight plastic bags or containers (or both) to remain workable. Stored clay can dry out, but it can be rehydrated and remixed to become workable again. This process is called reclaiming the clay. Unfired clay scraps can be recycled and remixed as well. Store clay in a cool area, but do not let it freeze, which would require additional wedging or kneading of the clay to make it ready to work with.

Clay Drying Process or the Moisture Stages of Clay

Clay should be handled differently during varying stages from wet to bone dry. Clay should also be dried slowly to avoid cracking. Store your piece on a wood or plastic bat/tray and keep it covered with plastic bags or an air tight container while you work on your piece so that it does not dry out before you're finished working on it. You can spray the piece with a water bottle, cover it with plastic, and leave it for a day or two. It should retain enough moisture to continue working on it when you return to the studio. When the piece is finished, keep it lightly covered allowing some air to get to it, so that it dries out slowly. This will keep your piece from drying too quickly and possibly cracking.

Moisture Stages of Clay

Slip - a liquid clay used for "slipping" and scoring to join pieces or for decorating and acts like glue (note that mold can grow in slip clay over time)

Sticky wet - clay that is too wet to be used because it sticks to your hands or the table

Wet - this consistency is best for wedging, building, and forming your object with techniques such as pinching, coiling, rolling slabs, or throwing on a wheel

Suede - clay that has stiffened up, but is still workable for techniques such as stamping, impressing, carving, slipping and scoring

Soft leather-hard - clay that is still flexible, can still hold its shape, and is workable for techniques such as carving, slipping and scoring

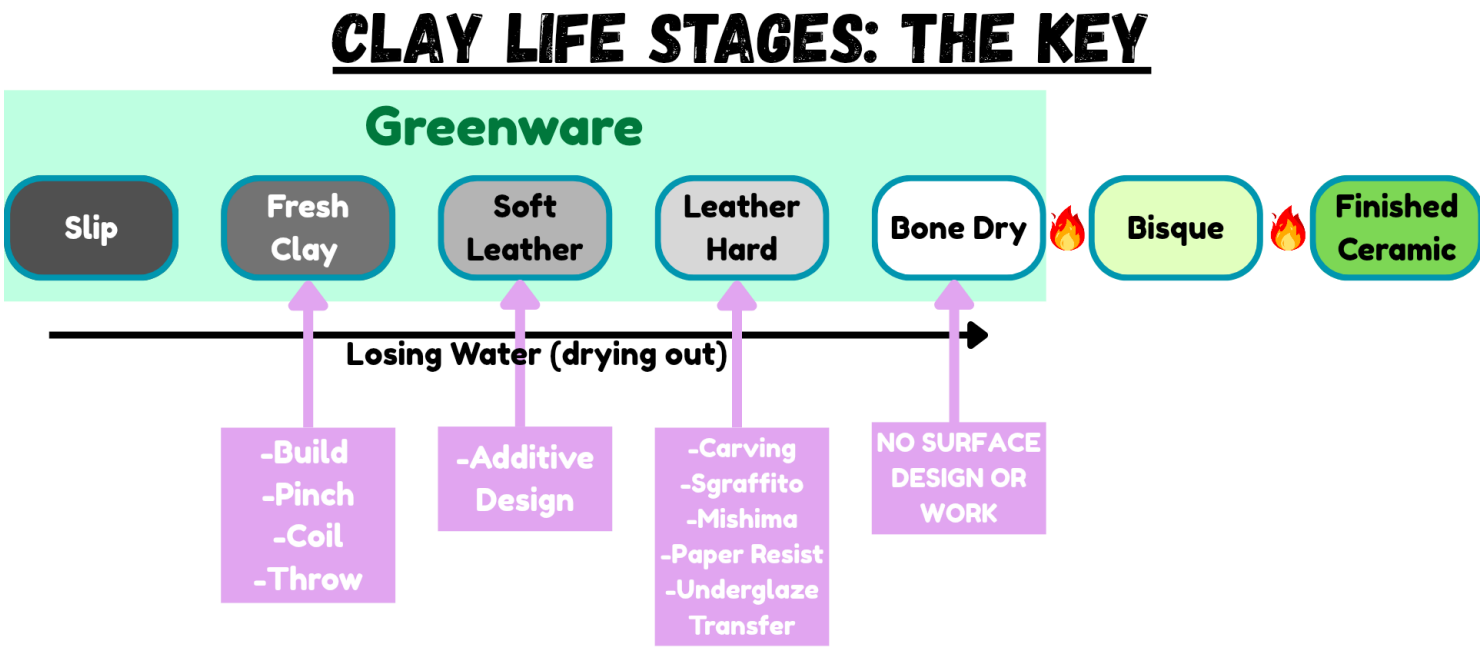
Leather hard - clay that holds its shape, isn't easily changed, and is workable for techniques such as slipping, scoring, and trimming

Hard or stiff leather-hard - clay that is in a more advanced stage of drying and can't change its shape without breaking

Dry - clay that has started to change color and the surface can be decorated without the risk of changing its shape

Bone dry - brittle clay that has completely changed color, has no moisture, is no longer cool to the touch, and is ready for underglaze decoration or to be bisque fired

The illustration from Sarah Mundy below tells what you can do with clay at each stage of clay life.



Stoneware Considerations

If you are working with stoneware, keep these things in mind:

- Stoneware is more or less vitreous depending on the temperature to which it is fired.
- Hobbyists can rarely fire stoneware to a point where it is completely vitreous; as a result food and drink containers must be glazed inside.
- Most stoneware clays are buff or gray in color when fired. These colors lend well to bold designs and intense colors rather than pastel tones.
- Stoneware is more chip resistant than earthenware when fired to a proper maturing cone.

Preparing the Clay for Work

Most premixed clay is packaged in 25 to 50 pound moist blocks. Before hand building or throwing on the wheel the clay must be wedged (kneaded) to condition and to drive out the trapped air bubbles. To knead (wedge) the clay, use your wire cutter to cut off an amount of clay you feel comfortable with (1-2 lbs for beginners is ideal) and form a ball. Flatten the ball of clay to a degree. Grasp the edge with both hands and fold it into the center of the ball with a downward push. Give the ball a quarter turn and repeat. Repeat the grasp, fold, push and quarter turn routine until the clay is ready to use. Do not be surprised if you must spend 15 minutes or longer on this process. You can never over knead the clay. **Air bubbles can create problems, causing the piece to explode in the firing kiln**.

Some potters will season the clay after the initial preparation. In the seasoning process, you will want to store workable sizes of clay balls inside an airtight container for a day or two. The result is a clay body that is highly workable.

Keep accurate notes as you proceed.

Skill Options

In this unit, you will learn three types of techniques for hand-building in ceramics; pinch pots, draped shape and sagged shape.

Pinch Pot Techniques

A simple pinch pot is recommended for beginning Juniors. No molds are required for pinch pots as your fingers create the shape.

Unit 1 - Create with Pinch Pots Project 1

Tools and materials needed:

- Clay
- Cloth
- A small container of water
- Modeling tool
- A small sponge

Steps

1. First sketch out your design.
2. You should have a piece of prepared clay that will fit easily into the palm of your hand (about the size of a small tennis ball).
3. Shape the clay into a round ball.
4. Hold the ball of clay in the palm of one hand and gently push the thumb of the other hand into the center of the ball.
5. Rotate the ball as the thumb and fingers form the pot with a gentle squeezing method. This process should go slow and gradually; **do not** form the pot too quickly or you will create cracks in the walls of the pot.
6. Let the first two fingers press from the inside and your thumb press against the outside attempting to achieve uniform thickness of the walls of your pot.
7. Always support the clay in one hand while working with the other hand.
8. If the wall starts to crack as you work on it, moisten and mend the crack by smoothing it out with your fingers and a little water or a sponge. Be careful not to let your piece get too wet.
9. When your pot is about 1/4 inch thick (bottom and sides), press the bottom of the piece gently against a level surface. This will create a flat bottom and prevent the piece from "rocking" when upright.
10. The rim may be leveled by using a knife.
11. A damp sponge can be used to smooth sides and rim.
12. Carefully carve a design and/or apply texture to the sides of the piece if desired.
13. It is good to consider scratching your initials and a date or year on the bottom of your piece.
14. Let your piece dry thoroughly and fire the piece to the correct cone size.
15. Sculpture with pinch pots is recommended for seniors and/or repeating members.

Animals are great fun. Dinosaurs, pigs, elephants, rabbits, owls, turtles, to mention a few, can easily be shaped by joining two or more pieces, using the pinch pot method.

16. Use the crosshatch scoring and slip method on areas that will be joined.
17. Make a slurry (slip) with a small amount of clay and water.
18. Dampen both sides that will be joined with the slip and attach the pieces.

Steps Continued

19. Apply a thin coil on the seam of the two pieces you joined together smoothing it out over the seam with a pallet or knife tool to make the two joined pieces appear seamless.
20. Be sure to put an air hole, using a pin or needle tool, in pieces that may have air trapped inside.
21. Small pieces such as legs, tails and heads can be made out of solid coils.
22. You can attach them the same way with the score and slip method. Be creative!
23. Evaluate your piece using the judging sheet as a guideline.

Lining Molds for Drape and Slump Shapes

When creating drape or slump shaped ceramics pieces, you will need to find or create a form, such as a bowl, newspaper mold, styrofoam, cardboard or wood form, to drape your clay slab over for drape molds or to slump your clay slab into for slump shapes. To line your molds, you can use material such as plastic wrap, linen, thin fabric, or dampened layers of newspaper. Place them over or into the mold before you add the clay slab to keep the clay from sticking to the form.

Draped Shape
Recommended for beginning Juniors.

Unit 1 - Create with Draped Shape Project 2

Tools and materials needed:

- Two strips of wood approximately 3/8" thick and 12"-24" long
- A wooden rolling pin
- An approximately 18" square piece of canvas or burlap material
- An object which to drape the clay (slab) over (bowl, pan, etc.)
- One ball of properly prepared clay to accommodate the size of your project
- Small brush
- Small sponge
- Medium size piece of plastic
- Small container of water
- Small container for slurry
- A flat level surface to work on

Steps

1. Sketch out a design of what you plan to make with measurements and details included.
2. Place the ball of clay in the center of the canvas material. Start to flatten out the ball first by pressing the ball down with the palms of your hands, rotating and flipping it over then doing the same to the other side so your ball of clay begins to stretch out evenly.
3. Once the ball is about an inch thick, proceed by placing the strips of wood on each side of the clay, wide enough that the ends of the rolling pin sit on the wood strips.
4. Begin rolling the pin down the wooden strips over the clay with even pressure, flipping it and turning it as needed until you make a slab approximately 3/8" thick.
5. Drape your slab over your convex form that you prepared by covering it with plastic wrap, newspaper, or cloth and trim the excess clay off.
6. Then shape and smooth the edges and walls. You may continue to shape until you create the desired effect.
7. To make feet for your project, roll three or four balls of clay (depending on size of project) of equal size and shape. Flatten one side of each ball.
8. Score and slip the flat side of the balls and the bottom of your piece where the feet will be attached, and then gently press them together. Be sure the placement of the feet will be balanced on your project.
9. Place a wood or plastic bat/tray on the feet to assess if the piece will sit evenly on a flat surface.
10. Take a damp brush or sponge and smooth the attachment site.
11. Now you can add any other decorative details or carvings to your piece.
12. Cover lightly with a piece of plastic to slowly dry to a soft leather state. If the project is left too long, over the draped object, it will crack. The cracking is due to shrinkage of the clay.

Unit 1 - Create with Draped Shape Project 2

Steps Continued

13. Once your piece has reached a soft leather state, carefully remove from the form that your piece is draped over.
14. Consider signing and marking a date or year on the bottom of your piece.
15. When your piece has dried to the leather hard state, clean rough edges with a damp sponge or cloth making sure not to get the clay too wet.
16. Then dry completely and fire to proper cone size.
17. Evaluate your piece using the judging sheet as a guideline.

Unit 1 - Create with Sagged Shape Project 3

Tools and materials needed:

- Two strips of wood approximately 3/8" thick and 12"-24" long
- A wooden rolling pin
- An approximately 18" square piece of canvas or burlap material
- An object which to slump the clay (slab) in to (bowl, pan, etc.)
- One ball of properly prepared clay to accommodate the size of your project
- Assorted tools for smoothing and/or carving into clay (see list of tools in introduction to terms)
- Small brush
- Small sponge
- A plastic shopping bag or trash bag to cover your work
- Small container of water or spray bottle
- Small container for slurry
- A flat level surface to work on

Recommended for beginning Juniors.

Steps

1. This project is very similar to the draped shape project, except you are going to sag the clay slab into your concave article (bowl, free hanging sling, etc.) that is prepared with a plastic, newspaper or cloth lining.
2. After preparing the slab to the size you wish, sag it into the article you have chosen for this project. If feet are desired, follow the directions in the draped shaped skill, applying your feet only after your clay has reached a soft leather hard dryness and you can safely remove it from the form without it losing its shape.
3. Cover the project with plastic to dry slowly. When the piece is dry and clean, fire it to bisqueware.
4. Evaluate your piece using the judging sheet as a guideline.

Seniors and repeating members must show an extra degree of difficulty.

Unit 1 - Exhibit Piece

Basic Information

Now that you have explored the skill options for this unit, you will need to construct a piece using one of or a combination of the learned techniques in this unit and create an exhibit piece to enter for 4-H exhibit judging day and your county fair. Did you like making a pinch pot, sagged shape or draped shape the best? You may want to explore different ideas by experimenting with your clay. It is time to be creative and have fun using your imagination! Whichever technique(s) you want to use for your project piece, have fun and enjoy the process. Remember to apply what you have learned from the Principles and Elements of Design in Ceramics when designing your piece. Your 4-H leader can help you decide if you are not sure which technique(s) to use for your exhibit piece.

Bisque Firing

Once construction of your project(s) is complete, you must be sure the clay is dried completely so it is solid with no cracking. Remove any debris or imperfections before you load the kiln for bisque firing. Bisque firing is required for your display item(s). If you do not bisque fire your exhibit, it will be much more likely to be damaged or break during judging. For Units 1 and 2, you will only bisque fire your exhibit for judging. You will not need to add glazes or underglazes until later units.

Unit 1 - Exhibit Piece

Guidelines for Judging Your Project

Judges look very closely at the following characteristics of your exhibit piece.

Creativity and Originality

- Shows thoughtful design, not just technical assembly.
- Unique interpretation of traditional slab/coil methods.
- Cohesive artistic voice or theme.

Cleaning

- Smooth areas are intentionally smooth; textured areas are cleanly executed.
- No unintended tool marks, fingerprints, or smudging.

Construction Quality - This evaluates how well the piece is built.

Structural Integrity

- Walls are even in thickness and appropriate for the form.
- Seams (slab joints, coil joins) are fully blended and secure.
- No cracks, stress fractures, or weak points—especially at joins, handles, rims, and lips.
- The base is level and stable.

Technique Mastery

- Slabs are compressed and joined cleanly; edges are smoothed.
- Coils are consistent and properly blended inside and outside.
- Corners, angles, or curves (if part of the slab form) are crisp or intentionally shaped.
- Attachments are secure

Texture and Design - This evaluates the artistic and functional aspects.
Proportion and Balance

- Form feels visually cohesive and properly weighted.
- The piece stands evenly and is not unintentionally lopsided.
- Coils or slab surfaces contribute to the design rather than distract.

Bisque Fired Only

- Appropriate for either functional or decorative use
- Is the piece strong and sturdy? Check for cracks or areas that might break easily.

Workmanship - This looks at the overall care put into the work.

- Attention to Detail
- Edges, rims, and joins are refined.
- Demonstrates skill appropriate for the artist's stated level.

Slab and Coil Constructed

Image Source: https://www.alabamaart.com/blogs/studionotes/introduction-to-pottery-handbuilding-throwing?srsltid=AfmBOoo8AIs_Bb47EBXbLsfYGbHL0zamK0W_288RIdy5wff3bHD3rf5U#techniques

Unit 2

Before you begin work on your Unit 2 project, review the "Basic Information" section from Unit 1 of this manual.

Project Requirements

Create one functional or decorative art piece that is at least 4" in width or height and no larger than 12" in width or height using one of the hand building techniques listed without molds. Display items must be bisque fired only - NOT GLAZED.

- Slab (examples include a box, vase, cup, wall hanging, sculpture, etc.)
- Coil (examples include a vase, bowl, pitcher, or cylinder, etc.)

Skill Options

In this unit, you will learn two types of techniques for hand-building in ceramics; slab construction and coil construction.

Slab Construction

Slab construction is a hand-building technique in ceramics where flat sheets of clay (slabs) are used to make three-dimensional forms. The slabs are rolled out to a consistent thickness and then cut, joined, and shaped to form the desired object. Some examples of items you could make using slab construction include a box, vase, cup, wall hanging, sculpture, butter dish, jewelry dish, or a sponge holder.

Unit 2 - Create with Slab Construction Project 1

Tools and materials needed:

- Prepared clay (enough for the size of box you are making)
- Paper, pencil and scissors to make your pattern
- Slurry or slip
- Cleaning tool or needle tool for scoring
- Sharp, thin blade knife

Follow these directions to practice creating a box out of slabs of clay.

Steps

1. Make a pattern for the top, bottom and walls of the box out of paper.
2. Roll out your clay into a slab as directed in the drape shape section.
3. Cut pieces from your pattern and lay aside on a clean dry area, covered with plastic and/or a damp cloth so your slabs do not dry out too quickly.
4. Let the clay pieces dry to a leather hard state so they will support themselves.
5. Beginning with the base, score and slip all four of the edges.
6. For the walls of your box only score and slip three of the edges.
7. Lightly press together two walls to the base creating half of your box, and then add one more wall at a time until you have made the box.
8. Roll out 1/8" coils.
9. Add the slurry to the corners of the box and place the 1/8" rolls in the corners using your fingers or a small round tool, press and smooth coils into the corners while supporting your outside wall.
10. By adding these coils, it will strengthen the construction of the box and keep it from falling apart or opening up in the bisque firing.
11. If you wish to make a lid, determine the design of it and how it will sit on the top of your box. If it sits flush to the top of your box, make sure to add a coil lip that will sit inside the box shape to keep your lid from slipping off the top of your box.
12. Smooth the edges and the outside of the box.
13. With a thin-blade sharp knife, approximately 1" (from the top), cut a wavy line all around the box forming the lid.
14. Remove the lid, turn upside down and reinforce the corners.
15. Place the lid back on the box to dry. If you want to add knobs or handles to your box, add them with the slurry at this time.
16. Evaluate your piece using the judging sheet as a guideline.
17. Cover with plastic, dry slowly so it does not crack.
18. Fire your project to the proper cone size.

19. Decorate as you like and fire again. Evaluate your piece using the judging sheet guidelines.

You can make many unique pieces with this technique. A simple box is recommended for beginning juniors. Seniors and repeating members must show an extra degree of difficulty.

Coil Construction

Coil construction is a hand-building technique where a vessel is formed by building up walls using long, cylindrical pieces of clay called coils. The coils are rolled out and then wrapped or stacked on top of each other to create the desired size and shape. Some items you could make using coil construction include a vase, bowl, pitcher, cylinder, mug, teapot, serving dishes, sculpture, and wall art. Coils can also be used to create unique textures on the surface of a piece, adding visual interest and depth.

Types of Coils for Coil Construction

There are various coil types used in hand-building. Coils are ropes of clay, which are stacked and joined to build up the form of the object. Using even pressure is key when rolling out a coil, so that it will be uniform. You can roll the clay between your hands, but it will be more even if rolled on a smooth work surface. It may take some practice at first to form the types of coils you would like to use in your project. Here are some of the different types of coils you can experiment with:

Rope Coils:
These are the most basic type, rolled into a long, rope-like shape.

Flat Coils:
These are flattened coils, often used for building up height quickly and creating precise forms with smooth surfaces.

Triangle Coils:
Shaped like triangles, these coils are strong and can be used to create interesting angles and distribute stress evenly.

Sculptural Coils:
These can be shaped into various forms and used to add decorative or structural elements to a piece.

Techniques for Using Coils in Ceramics

Rolling:
Clay is rolled into coils using even pressure between the hands or on a work surface.

Attaching:
Coils are attached to the previous layer using pressure, sometimes aided by scoring and slipping (applying a thin clay slurry).

Blending:
The connection between coils is blended to create a smooth, unified surface.

Smoothing:
A rib tool or other smoothing tools are used to refine the shape and surface of the piece.

Joining:
Coils can be joined in a spiral, sewed, or half-hitch manner, depending on the desired effect.

Building:
Coils are stacked layer upon layer, gradually building up the desired form.

You can try some of these additional ideas for constructing with coils.

- **Spiral**:
  Coils are wrapped around the base in a spiral pattern to create a vase or bowl.

- **Stair-step:**
  Coils are stacked with a slight offset to create a textured effect.

- **Snail coil:**
  A coil is spiraled in on itself to create a rounded, textured surface.

- **Fence coil:**
  Coils are attached vertically to create a fence-like structure.

- **Flat coil:**
  Used for creating a smooth, even surface or for adding flat decorative elements.

Unit 2 - Create with Coil Construction Project 2

Tools and materials needed:

- Prepared clay
- Canvas, a plaster bat or a piece of plasterboard
- Slurry (slip)
- Cleaning tool or needle tool for scoring
- Knife or Fettling knife

Follow these directions to help you practice creating a vase or cylinder out of coiled clay.

Steps

1. Determine the shape and size of the pot and cut a base, following the slab technique. The base may also be formed by tightly formed coils, but the "coil type" base is more likely to open during the first firing.
2. Place the base on a piece of canvas, a plaster bat, or piece of plasterboard.
3. You will now need a needle tool, small brush, slurry and a small container of water.
4. Begin by rolling several lengths of clay rope pieces. They may be between 1/4" to 1/'2" in diameter and consistent in size.
5. Score the top edge of the base and one side of the clay rope with a needle tool.
6. Apply the slurry to the scored edge of the base and place a coil on top.
7. Press firmly and smooth with damp fingers. The two rope ends that butt together should be cut on an angle, scored, and attached with the slurry.
8. The shape of the piece may be changed by simply making the clay rope longer or shorter. As you add the longer clay rope the pot will expand outward. Shorter clay ropes will create the opposite as they are added.
9. As you work the piece upward, after adding a few clay coils, smooth the inside coils with slightly dampened fingers. The outside may be also smoothed (optional). Smooth the edges.
10. Let the piece dry slowly and bisque fire when completely dry.
11. Glaze the bisque piece and fire to the proper cone size.
12. Evaluate your piece using the judging sheet as a guideline.

Unit 2 - Exhibit Piece

Basic Information

Now that you have explored the skill options for this unit, you will need to decide which construction techniques you would like to use for your exhibit piece to enter for judging at your county fair or 4-H exhibit judging day. Did you like creating with a slab or with a coil the best? Or you may want to explore combining techniques in one piece. It is time to be creative and have fun using your imagination! Whichever technique(s) you want to use for your project piece, have fun and enjoy the process. Your 4-H leader can help you decide if you are not sure which techniques you would like to use. Remember to apply what you have learned from the Principles and Elements of Design in Ceramics when designing your piece.

Bisque Firing

Once your exhibit pieces are dry, you will need to bisque fire them to prepare them for judging. Remember, glazes are not used in Unit 1 or Unit 2.

Guidelines for Judging Your Unit 2 Project

Judges look very closely at the following characteristics of your exhibit piece.

Creativity and Originality

- Shows thoughtful design, not just technical assembly.
- Unique interpretation of traditional slab/coil methods.
- Cohesive artistic voice or theme.

Cleaning

- Smooth areas are intentionally smooth; textured areas are cleanly executed.
- No unintended tool marks, fingerprints, or smudging.

Construction Quality - This evaluates how well the piece is built.

Structural Integrity

- Walls are even in thickness and appropriate for the form.
- Seams (slab joints, coil joins) are fully blended and secure.
- No cracks, stress fractures, or weak points—especially at joins, handles, rims, and lips.
- The base is level and stable.

Technique Mastery

- Slabs are compressed and joined cleanly; edges are smoothed.
- Coils are consistent and properly blended inside and outside.
- Corners, angles, or curves (if part of the slab form) are crisp or intentionally shaped.
- Attachments are secure

Guidelines for Judging Your Unit 2 Project Continued

Texture and Design - This evaluates the artistic and functional aspects.
Proportion and Balance

- Form feels visually cohesive and properly weighted.
- The piece stands evenly and is not unintentionally lopsided.
- Coils or slab surfaces contribute to the design rather than distract.

Bisque Fired Only

- Appropriate for either functional or decorative use
- Is the piece strong and sturdy? Check for cracks or areas that might break easily.

Workmanship - This looks at the overall care put into the work.

- Attention to Detail
- Edges, rims, and joins are refined.
- Demonstrates skill appropriate for the artist's stated level.

Underglazes

Image Source: https://berkeleypotters.com/wp-content/uploads/2017/09/IMG_8319-002.jpg

Unit 3

In this unit, you have the choice of glazing a bisqueware object you have purchased or glazing a hand-constructed item, sculpted or wheel thrown item you made using any of the techniques learned in Unit 1, Unit 2, Unit 7, or Unit 8. If you make your own item to fire with an underglaze, review the "Basic Information" section from Unit 1 of this manual.

Project Requirements

Produce one functional or decorative art piece that is at least 4" in width or height and no larger than 12" in width or height using underglaze techniques (i.e., brush stroke work, tinting specialty glazes, airbrushing, layering colors, etc.). The art piece may be either purchased greenware or bisqueware, OR a hand-constructed piece created by the member. Judging will primarily be on the quality of underglaze techniques.

- Enter the Underglazes Hand Constructed class if the exhibit item was made by the member.
- Enter the Underglazes Purchased Greenware/Bisqueware class if the exhibit item was purchased by the member.

Basic Information

1. Underglaze can be applied to greenware and fired in a low fire greenware firing before any clear coat or mixed glaze is applied to the bisqueware stage.
2. Underglazes may also be applied to bisqueware with a clear coat over top of it fired to the cone specifications of the underglaze. The results of this type of application can vary greatly and be a bit difficult in application as the bisqueware is porous and hard to gauge how many coats are needed to obtain adequate results and may require quite a bit of testing before achieving satisfactory results.
2. This is not recommended unless the underglaze label suggests this type of application. In some cases, applying to bisqueware is easier for detailed work.
3. If working with bisqueware, wash it with cold water to remove dust and let it dry completely before applying underglaze. If working with greenware, be careful not to smudge the underglaze.
4. The underglaze may be thinned, with underglaze medium or water, for desired consistency.
5. Underglaze may be intermixed to create color variations. Refer to types of underglazes.
6. For a solid, opaque color, you can typically apply two to three thin coats of underglaze, allowing each coat to dry before applying the next coat.
7. The underglaze may be applied with a brush, sponge, airbrush or a variety of other available tools.
8. Underglaze may be used in a sgraffito technique.
9. You can apply underglaze and fire it as it is, or you can apply a clear glaze over the dried underglaze for a glossy finish.
10. Underglazes must be applied smoothly and precisely because they do not move in firing.
11. Underglazes require specific cone firing as indicated on the underglaze labels.

Types of Most Common Glazes

1. Opaque underglaze is usually made from a clay base and should not be mixed with different kinds of underglaze or any of the glaze types. It is mostly used for solid coverage and can be thinned with underglaze medium or water. This type of underglaze works well for:
    a. Figurines
    b. Blocking in design work

2. Transparent underglaze is made with concentrated colorants and less clay base. It is usually thinned with an underglaze medium or water. This type of underglaze works well for:
    a. Brush stroke work
    b. Tinting specialty glazes
    c. Airbrushing

3. Specialty underglaze is usually made with a frit base. It can be mixed with its own kind. Very rarely can it be mixed with other ceramic media. The most popular colors in this type are red and orange. It is recommended to follow the manufacturer's instructions for proper application.

There are new and improved ceramic media introduced daily. It is very important to read all labels for recommended application and firing instructions.

Have your project leader, parent and/or ceramic studio help you choose your greenware and underglazes. They will be able to assist you in your choices and guide you.

Why Do Problems Happen and How to Fix Them?

Sometimes underglaze colors look streaky after firing because not enough coats were applied or the brush was dipped in water, which thins the color. To fix this, apply more coats and avoid adding water to the brush.

If colors look faded after firing, it might be because the glaze used doesn't match the underglaze. Always use glaze and color from the same brand. Overfiring can also change colors—refire to the correct temperature to bring back the true color. Stir colors well and apply enough coats.

When glaze chips or peels off, the piece might have dust, fingerprints, or polished spots that resist glaze. Sometimes the bisque wasn't fired enough. Test by scraping with a coin: if it cuts in, it's underfired. Clean the piece and make sure the underglaze isn't too thick.

Pinholes in glaze usually mean there was dust. Make sure the piece is dust-free before glazing. If pinholes appear, rub the dry glaze with the heel of your hand to fill them.

Cracks or pinholes in underglaze can happen if coats are too heavy, applied before the previous coat dries, or if the color is old. Fix by lightly sponging the area to seal cracks.

If greenware resists underglaze, it's often because of dust or body oils. Wipe with vinegar water before applying underglaze.

Sponged pieces look streaky when color is dragged instead of using a dabbing method. For wash-away pieces, glaze may peel if wax wasn't cleaned off—scrub away residue and refire.

Airbrush problems? If it won't spray, the color may be too thick or the vent clogged. If it spatters, the color may be too thin or the airbrush is too close. If it spits, there may be foreign matter or low air.

Underglazes Technique List

In the ceramic technique chart below, put the date when you learned the skills. Place a check mark in the column of skills you would like to learn. Discuss skills you would like to learn with your leader. She/he will be able to give you hints on how to achieve your goals.

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Detailing (Embossing): opaque, translucent, specialized, velvet. Application of color to a design already in the greenware.		
Antiquing: A method of applying color, then wiping it down.		
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.		
Polish with Opaque Underglazes: Southwest Indian technique that has been passed down for generations.		
Texturing: Thickened underglaze to form a textured pattern or background.		
Veiling: Designing work using translucent underglaze and a sponge.		
Sgraffito: The act of scratching a design through a colored slip that is painted over a piece to reveal the clay underneath.		

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Altering the greenware pattern for a special effect.		
Mishima: A technique where fine lines, pattern, or a design is carved into leather-hard greenware then filled with contrasting slip or underglaze and then the excess is wiped away to reveal intricate, inlaid designs. This is like the opposite of sgraffito.		
Stenciling: Cut-out patterns used to apply a design by brushing, sponging, or spraying onto the clay.		
Free Brush Design: A brush design where the strokes of the brush are apparent.		
Simulated China Painting (using transparent underglazes, double and triple loading the brush with several colors to give a feeling of China painting).		
Majolica Underglaze: applied over satin or matte glaze.		
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.		
Miscellaneous: A combination of techniques or any other underglaze not listed. Include a technique sheet.		

Unit 3 - Underglazes Rainbow Color Theory Study Project 1

Basic Information

Project 1 is a color study using transparent underglazes. Learning color mixing with underglazes is very similar to color mixing with paint. This process can be achieved two different ways: one through the process of mixing two underglazes together before applying, like paint to achieve new color combinations, or through the process of layering underglazes on top of one another directly on the piece. This technique is similar to working with watercolor paints and layering colors on top of one another to achieve new colors. Through experimentation, there are a countless number of colors that can be achieved through using color theory with underglazes on pieces.

There are many color combinations to choose from when mixing underglazes. However, it is best to start with the use of the primary colors: red, yellow, and blue. These three colors can not be created (just as in painting), but can be used to make other colors.

- Red + Yellow = Orange

- Yellow + Blue = Green

- Blue + Red = Purple

Depending on the number of layers applied, other combinations of colors could be achieved as well (Ex: mixing or layering more red than yellow underglaze will create a red-orange, which is a tertiary color). For this project, we will just stick with equal parts of each primary color.

> This project will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this learning activity in your record book.

Steps

1. Select suitable greenware or bisqueware (small vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.
2. Prepare work area.
3. Follow the safety rules.
4. Clean greenware with proper tools. Initial and date the bottom of the piece for identification.
5. After you have checked for seam lines and imperfections, remove excess dust from your piece using a damp sponge.
6. Create “guide lines” on your piece. This can be done by drawing vertical lines about .5 inch to 1 inch apart until the whole piece is complete (These will be our areas of new colors). You can use a pencil or marker as they will burn off in the firing process.

Steps Continued

7. Place a red, yellow, and blue underglaze on your work.
8. Dilute the underglaze with underglaze medium or water (distilled is recommended) to a canned milk consistency.
9. Using your brush, begin by brushing red onto the first vertical line.
10. Next, clean the brush thoroughly and be sure to not leave excess water in the brush either. Then apply the yellow underglaze to fill in the vertical line next to the previous.
11. Once dry, rinse the brush again and use the red underglaze to layer on top of the previous yellow "stripe" created (this will be our orange stripe).
12. Next, clean your brush and apply the yellow underglaze onto the next stripe in the pattern.
13. Cleaning your brush, use the blue underglaze to paint on the blue underglaze onto the next vertical stripe.
14. Once dry, clean your brush and apply yellow underglaze on top of the blue "stripe" that was previously created (this will create our green).
15. Upon rinsing your brush, use the blue underglaze to paint the stripe next to our "green" stripe blue.
16. Next, rinse your brush to apply red underglaze next to the previous one.
17. Next, after cleaning your brush, apply the blue underglaze on top of the red "stripe" previously done once it is dry (this will create our purple "stripe").
18. Repeat Steps 9-17 until the entire piece is completed.
19. Clean the worktile and brush and reshape your brush.
20. Fire to the proper cone.

Continued Steps After First Firing

1. Prepare a working area.
2. After cleaning the bisqueware piece with a damp sponge and letting it dry completely, apply a wax resist or do a hot wax dip to the bottom of your piece. Make sure the wax completely covers the bottom and comes up the sides about ⅛" to ensure the clear coat glaze does not get applied too low on the sides of the piece or any gets on the bottom of your piece because this can cause your piece to stick to the kiln shelf in the second firing.
3. Apply two coats of clear coat glaze. Be sure the piece is dry before applying the second coat.
4. Clean your brush and reshape.
5. Fire to the proper cone.
6. Complete your ceramics e-record project and expense supplement sheet.
7. Evaluate your project using the Unit 3 guideline or scoresheet for judging.

Unit 3 - Underglazes Brush Stroke Study Project 2

Basic Information

Brush stroke illustration

Project 2 is a brush stroke study using translucent underglazes. Learning brush strokes is similar to learning to play a musical instrument. You may want to practice the basic brush strokes on paper or on a clear polypropylene sheet protector until you feel comfortable to apply your learned skill on your piece. Try designing several daisy patterns on paper with watercolors or acrylic paints to practice the brush strokes. Different types of brush strokes can help you create botanical designs for things like flowers, leaves, trees, grasses, and other elements inspired by nature.

- This project will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include picture of the activity in your record book.
- You may need to purchase a round brush (#4 or #6).

Place a polypropylene sheet protector over the brush stroke illustrations and practice the brush strokes. After you fill the page, just wash the protector off and repeat the process. Remember that you do not need to stay within the boundaries of the detail. This is known as "free brush." Perseverance is very important and the reward comes with your sense of accomplishment.

Unit 3 - Underglazes Brush Stroke Study Project 2

Steps

1. Select suitable greenware or bisqueware (small vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.
2. Prepare a work area.
3. Follow the safety rules.
4. Clean greenware with proper tools. Make sure your piece is initialed and dated on the bottom of the piece for identification.
5. After you have checked for seam lines and imperfections, remove excess dust from your piece using a damp sponge.
6. Trace or sketch a daisy pattern onto the piece. Members repeating this unit may want to design their own pattern.
7. Wash the new brush with soap and water. Rinse the brush and reshape.
8. Prepare a translucent yellow underglaze for your first flower.
9. Dilute the underglaze with underglaze medium or water to a canned milk consistency.
10. Thoroughly clean and rinse the brush again and reshape by pulling the brush across a paper towel trying not to leave any excess water in the brush.
11. With a well loaded flat or rounded tip brush, start at the top of the petal and use the tip of your brush to apply pressure and pull your brush inward to a point towards the center of the flower. In doing this, you are creating a "fat rounded" top, with pressure. You are then easing up on the pressure as you stroke inwards to the center to form the more narrow part of the petal, and ending by pulling the brush away from the object to make the final point. A delicate steady hand is better than a heavy hand. With practice you will learn how much pressure to put on your brush. Keep turning your piece so you are pulling your brush strokes towards yourself. You may need to rinse your brush and thin your underglaze often.
12. Mix a diluted yellow-orange translucent underglaze to a canned milk consistency.
13. Using the handle end of the detail brush, fill the center of the flower with dots of the yellow-orange colored underglaze.
14. Mix a diluted yellow-green translucent underglaze to a canned milk consistency.
15. Using the tip of a pointed tip brush paint a stem for your flower. Fill in leaves along the stem by using the same brush and brush strokes as you used on the petals starting at the stem and pulling away gently letting up pressure as you pull to create a leaf.
16. Dilute a small amount of black green translucent underglaze. Thin to a light cream consistency.
17. Using a #1 liner brush, outline the petals and leaves. Place dots inside the center of the flower for a shadow effect and to create depth. Refer to illustration for placement.

18. Clean the brush and reshape.
19. If you would like, try mixing some other colors using your knowledge from the color wheel exercise in the beginning of this ceramics manual to create more flowers around your piece.
20. Fire to the proper cone.

Continued Steps After Bisqueware Firing

1. Prepare a working area.
2. After cleaning the bisqueware piece with a damp sponge and letting it dry completely, apply a wax resist or do a hot wax dip to the bottom of your piece. Make sure the wax completely covers the bottom and comes up the sides about ⅛" to ensure the clear coat glaze does not get applied too low on the sides of the piece or any gets on the bottom of your piece because this can cause your piece to stick to the kiln shelf in the second firing.
3. Apply two coats of clear coat glaze. Be sure the piece is dry before applying the second coat.
4. Clean your brush and reshape.
5. Fire to the proper cone.
6. Complete your ceramics e-record project and expense supplement sheet.
7. Evaluate your project using the Unit 3 guideline or scoresheet for judging.

Colors and patterns for Project 2 are suggestions only. You may want to design your own pattern and/or choose different colors. Be creative! The secret to brush work is learning to relax and to control the brush. The more you practice the more you will relax, and your brush strokes will improve. Working in watercolor or acrylic paints on paper will allow you to practice the brush stroke techniques at a more cost effective pace.

Unit 3 - Underglazes Exhibit Piece

Basic Information

Magnificent! You have completed projects 1 and 2. Here are some skills you have learned:

- Color theory for layering underglazes
- Basic brush strokes for creating botanical designs
- Application of opaque and translucent underglazes

You are ready to complete Project 3 which may be your exhibit piece. This will be your "design and create" piece. You may use the skills you have learned or apply a new skill. Remember to apply what you have learned from the Principles and Elements of Design in Ceramics when designing your piece. If time permits you can complete several projects. Evaluate your piece using the Unit 3 guideline for judging.

Suggestions

1. Before choosing what your exhibit piece will be, and if you have the opportunity, go to several ceramic studios to see other ideas and possibilities.
2. Look through ceramic publications for technique ideas.
3. Be sure to stay within your unit medium (underglaze).
4. You may want to change your piece by alternating the design of the Greenware.
5. Practice your design on paper first so you can execute proper proportions and balance of your design before you put it on your piece.

Steps

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.

2. Follow cleaning steps.

3. Decide on the technique you wish to achieve. Your leader will guide you. If you do not have a ceramic project leader, contact your Extension Specialist so she/he may be able to connect you with a local project leader or a knowledgeable person. If neither is available, you can research what you want to know on the Internet, at a library, or ask staff at a ceramics supply store, or visit a ceramics studio and consult with an instructor or artist there.

Firing Your Piece

By now you will have applied an underglaze to either greenware (wet clay) or bisqueware (already fired once). Next, you will have let your piece(s) dry. Then fire to the temperature recommended for your specific underglaze and clay body. You can stack greenware when bisque firing, but glazed pieces should not touch in any firing.

After cleaning a bisqueware piece with a damp sponge and letting it dry completely, apply a wax resist or do a hot wax dip to the bottom of your piece. Make sure the wax completely covers the bottom and comes up the sides about ⅛" to ensure the clear coat glaze does not get applied too low on the sides of the piece or any gets on the bottom of your piece because this can cause your piece to stick to the kiln shelf in the second firing.

Guidelines for Judging Your Project

- 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.
- Innovative methods (sgraffito, mishima, underglaze transfers, layering, etc.)?
- Decoration should complement the vessel's curves, angles, and proportions.
- No pinholes, dust, fingerprints, or smears in underglaze areas.
- Line quality: Clean, confident lines without unintended wobbling or blotches.
- Brushwork: Even, deliberate strokes. No accidental streaking unless stylistically intended.

Unfired Finishes

Image Source:
https://substackcdn.com/image/fetch/$s_!3gTY!,w_1456,c_limit,f_webp,q_auto:good,fl_progressive:steep/https%3A%2F%2Fsubstack-post-media.s3.amazonaws.com%2Fpublic%2Fimages%2Fe7130daa-41bc-4c9a-9ca2-3870b6e973b2_1024x768.png

Unit 4

Project Requirements

Produce one functional or decorative art piece that is at least 4" in width or height and no larger than 12" in width or height using unfired finish techniques. If it is a functional piece, the application must be on the outside of the item to avoid potential toxic exposure from the materials used.

The art piece may be either purchased greenware or a hand-constructed piece created by the member. Judging will primarily be on the quality of unfired finish application.

- Enter the Unfired Finishes Hand Constructed class if the exhibit item was made by the member.
- Enter the Unfired Finishes Purchased Greenware/Bisqueware class if the exhibit item was purchased by the member.

Basic Information

Unfired Finishes are finishes you apply to your pottery once it has been bisque fired. These finishes allow you to create highly detailed decoration to your pieces. Underglazes are ceramic pigments suspended in a liquid medium, similar to paint, used for detailed decoration on pottery and put through a firing process, while oxides and stains are raw metallic compounds and pre-fired pigments used for coloring. Underglazes are applied to leather-hard, bone-dry, or bisque-fired clay, often before a final clear coat glaze. Unfired Finishes are applied to bisque-fired clay only.

Oxides are single metallic compounds, like iron or cobalt, used for washes and stains to highlight texture, while stains are pre-fired and more stable, making them more predictable for a wide range of colors. Wax can be used in a variety of ways with unfired finishes. Apply wax on bottoms of pieces to prevent any glaze from sticking to the kiln shelf during firing. Waxing can create a clean, unglazed ring on the bottom of the piece. Wax resist can be used to create designs by painting a pattern onto the bisque-fired piece. The glaze will not stick to the waxed areas, allowing the original clay color to show through after firing.

For a non-glazed piece, a clear coat, spray sealer, or varnish can be applied to bisqueware to add a protective finish. Or you may choose to clear coat glaze your piece to provide a finish as well. A transparent glaze will provide a glassy, non-porous finish, which can also make it waterproof and food-safe.

Unfired Finishes

- Are commonly referred to as stains, paints, or wax resists.
- Are usually restricted to decorative pieces.
- Are more suitable for earthenware bisque but some may be applied to porcelain.
- Require only one bisque firing, with the exception of pieces that are to be glazed inside to hold liquid (vases, pitchers, planters).
- Are best applied on highly detailed utility pieces that are bisque fired to cone 05, or to decorative pieces bisque fired to cone 06.
- Are forgiving. If you do not accomplish what you wish, the unfired finishes may be fired away. You then can remove residue and resume staining your piece.
- Are usually polished or sealed with a fixative (follow manufacturer's suggestions).

Types of Most Common Unfired Finishes

- Opaque is a water base stain that you are unable to see through (solid coverage).
- Translucent is used for antiquing, rouging, high lighting, shadowing and simulating china painting. Types of translucent stains are:
  - Water base
  - Oil base
- Metallics produce a "metal like" appearance. Types of unfired metallics are:
  - Powder
  - Oil base
  - Wax base
  - Varnish base
  - Water base
- Lusters are translucent which produce an iridescent sheen when applied over opaque colors or to bisqueware.
- Chalk produces a china painted porcelain look. It should be applied over sealed earthenware or polished porcelain.
- Gold Leaf is gold beaten into an extremely thin sheet. It is applied with an adhesive, usually to bisqueware.
- Sculpture paste or powder may be mixed with opaque stain for a color build-up technique. It is more suitable for earthenware.

Unfired Finishes Technique List

In the unfired finishes chart below, put the date when you learned the skills. Place a check mark in the column of skills you would like to learn. Discuss skills you would like to learn with your leader. She/he will be able to give you hints on how to achieve your goals. You may also want to research these techniques with the help of your leader.

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Altering the greenware pattern for a specific event.		
Application of water-base opaque stain.		
Application of **water-base** translucent (antiquing) stain.		
Application of **oil-base** translucent (antiquing) stain.		
Application of pearl stain.		
Application of metallic stain.		
Application of lustres stain.		
Chalk technique.		
Gold leafing technique.		
Dry brush technique.		

Unfired Finishes Technique List

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Wet brush technique.		
Simulating China paint technique.		
Rouging technique.		
Veiling technique.		
Stencil technique.		
Advanced human eye technique.		
Advanced animal, foul and reptile eye technique.		
Advanced brush stroke technique.		
Norwegian Rosemaling technique.		
Design work.		

Unit 4 - Unfired Finishes Opaque Stain Project 1

Basic Information

Project 1 is a lesson in opaque stain application. Senior members must combine two techniques (ex. antiquing over opaque stain). Repeating members of Unit 4 must indicate a progressive learning situation in their records. This piece will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book.

Brushes and supplies you may need to purchase:

- A variety of sizes of detail nylon brushes or stiff bristle brushes. Brush selection depends on the technique to be used.
- A soft to medium ox hair brush. Keep it away from your other brushes if used with oil base antique. Mark this brush to indicate it is to be used with oil base stain only.
- Solvent
- Fixative (sealer)

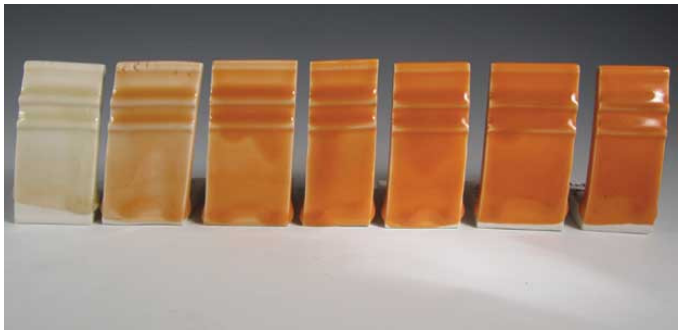


Image Source: https://ceramicartsnetwork.org/daily/article/Ceramic-Stains-The-Easy-Way-to-Create-All-the-Colors-of-the-Rainbow-on-Your-Pottery

Steps

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.
2. Prepare a work area.
3. Remember the safety rules.
4. Clean greenware using proper tools. If using bisqueware then clean it off with a damp sponge and let it dry.
5. Initial and date the bottom of the greenware piece for identification and bisque fire it.
6. Keep accurate notes as you proceed.
7. Prepare a work area. Do not use newspaper. Newspaper has a tendency to leave print on the piece.
8. Pieces requiring the inside to be glazed:
    - Prepare rolling glaze mixture and roll the glaze inside of the piece. Be sure to clean any unwanted glaze from the outside with a damp sponge.
    - Fire to cone 06.
9. Clean kiln dust from the piece with a damp sponge.
10. Start applying your paints. If laying make sure to start with your base colors adding details last and letting the layers dry in between each application.

Unit 4 - Unfired Finishes Opaque Stain Project 1

Brushing Technique

1. Pour a small amount of color onto a plastic paint palette or small plastic container.

2. Thin the color, with water, to a canned milk consistency.

3. Load a nylon brush tip with a small amount of color. Never load your brush with any more color than you can apply in a few seconds. Stains dry very quickly. If too much color is in your brush, and it dries, it will leave ripples.

4. The stain must be brushed out to create a smooth finish.

5. Overlap each time you reload your brush with the same color. Some colors may require two coats when using this form of application.

6. Seal the stain by polishing with a soft cloth or by using a (gloss or matte) fixative. Read the manufacturer's suggestions.

7. Dry and clean your work well each time you change colors.

8. Wash the brushes with soap and water. Never let the stain dry in the brushes.

Scrub Technique

1. Load your stiff bristle brush tip with a small amount of color and scrub the color into the piece until smooth. Overlap each time you refill your brush with the same color.

2. Before changing color on your work, be sure the bare bisque is not showing in the area in which you are working. Re-apply color if it is needed.

3. When the figurine piece is finished and you are satisfied with the application, add any intricate details or patterns if desired.

4. Seal the stain by polishing with a soft cloth or by using a (gloss or matte) fixative. Read manufacturer's suggestions.

5. Clean brushes with soap and water. Never let the stain dry in the brushes.

6. First year members may stop here or continue if they prefer.

Unit 4 - Unfired Finishes Opaque Stain Project 1

Oil Base Antiquing Technique

1. Apply a thin coat of dark brown antiquing over the entire stained piece using a soft to medium ox hair brush. The antiquing should be applied evenly. Let dry for a few minutes. Do not let it dry overnight.

2. You will need some pieces of t-shirt material and a pair of gloves. The t-shirt material will be used for rubbing the antiquing onto your piece. Another piece may be needed for the final "clean up."

3. Wrap one piece of t-shirt material around your index finger and moisten the cloth with the antiquing solvent. Hold your piece in your hand with your gloves on. Using the side part of your covered finger, wipe away the antiquing. Start from the top of the piece, and with one swipe, work your way to the bottom. Do not go deep inside detail areas that your cloth did not reach. This will give a natural shadowing effect. Change the moist antiquing cloth to a clean area often.

4. Once you have antiqued the piece, go over the piece once again with a clean moist antiquing cloth for the final cleaning. The colors under the antiquing should be bright and not muddy.

5. Seal the piece with a spray of fixative (gloss, matte, or porcelain). Apply fixative lightly two or three times. Over (heavy) application will make your piece cloudy.

6. Clean brush in mineral spirits, or petroleum base solvent, and then with soap and water.

Water Base Antiquing Technique

1. Using an ox hair brush, apply a thin coat of dark brown antiquing over the entire piece. Let dry for a few minutes. Do not let it dry overnight.

2. Wipe away antiquing with a damp sponge, from top to bottom in one swipe. Rinse the sponge with each swipe. Change the water often.

3. Colors under the antiquing should be bright and not muddy.

4. Seal the piece with a fixative.

5. Clean brush with soap and water.

Unit 4 - Unfired Finishes Advanced Brushstrokes Project 2

Basic Information

Brushstrokes are the marks your brush makes when you paint. On ceramics, different strokes help you create:

- Textures
- Shadows
- Outlines
- Soft blends
- Decorative designs

First year members will use a tile for this learning experience. Repeating members and seniors may use any plain surface piece. This project will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book. You will learn more new ceramic terms from your leader and/or the glossary. Keep accurate notes as you proceed. Here are some basic types of brushstrokes you can experiment with.

1. Line Stroke
What it does: Makes lines for outlining, shapes, or details.
How to do it:

- Use a small detail brush
- Light pressure = thin line
- Harder pressure = thicker line

Try it: Make a "skinny line → thick line → skinny line" without lifting your brush.

2. Flat Wash
What it does: Fills in big areas smoothly.
How to do it:

- Use a flat or round brush
- Paint in the same direction
- Keep your brush wet

Try it: Paint a smooth square—no streaks!

3. Gradient (Fade)
What it does: Makes one color fade into lighter color.
How to do it:

- Start with darker paint on one side
- Use a damp brush to spread it out
- Keep blending until it fades

Try it: Make a "dark-to-light" bar.

4. Dry Brush
What it does: Makes rough, textured strokes for wood, fur, grass, etc.
How to do it:

- Put paint on your brush
- Wipe most of it off
- Drag lightly across the tile

Try it: See how many different textures you can make.

5. Stippling (Dotting)
What it does: Adds dots to make shadows or texture.
How to do it:

- Use any small brush
- Tap the tip onto the clay

Try it: Make a dark dotted area → slowly fade it out into fewer dots.

Unit 4 - Unfired Finishes Advanced Brushstrokes Project 2

6. Pull Stroke
What it does: Makes leaf, petal, or hair shapes.
How to do it:

- Press hard at the start
- Then lift your brush to a point

Try it: Make a row of leaves or teardrop shapes.

7. Feather Stroke
What it does: Soft, light strokes for feathers, eyebrows, fur.
How to do it:

- Use a slightly dry brush
- Flick your brush outward

Try it: Make 5–6 short strokes that angle in different directions.

8. Scumbling
What it does: Creates a cloudy, mottled look.
How to do it:

- Dab your brush in small circles or taps.

Try it: Make a cloudy patch and build layers.

Other advanced brush strokes may include:

- Teardrop
- Curved teardrop
- Eyebrow
- "C" (forward and backward)
- "S" (forward and backward)
- Leaf stroke
- Thick and thin strokes
- Long and short stokes
- Design work combining different strokes.

Steps

This project will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book. You may complete the skill of your choice on a plain piece, tile or figurine.

Brushes you may use:

- Sable or Nylon Round brush (sized to fit brush strokes)
- Sable or Nylon Square Shader brush (sized to fit brush strokes)
- Sable or Nylon Liner brush (sized to fit brush strokes)
- Sable or Nylon Detail brush (sized to fit brush strokes)

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the slab techniques from Unit 2.
2. Prepare a work area with suitable covering.
3. Follow the safety rules.
4. If working with greenware, clean your greenware as outlined. Initial and date the bottom of your piece. Bisque-fire your piece to the correct cone.
5. On your tile or piece of bisqueware, practice any of the advanced brushstrokes to create an original design on your piece.
6. Have the piece fired to the proper cone if necessary.

Keep accurate notes as you proceed.

Brush Types and Brushstrokes Illustrated

Image Source: https://i.pinimg.com/736x/d2/c2/cd/d2c2cdf60fa32f1d2530779e973ee473.jpg

Unit 4 - Unfired Finishes Exhibit Piece

Basic Information

Fantastic! You have completed projects 1 and 2. You are ready to create your exhibit piece. Your functional or decorative art piece should be at least 4" in width or height and no larger than 12" in width or height using unfired finish techniques. The item may be either made or purchased and completed with your preferred method of unfired finishes, fired to completion with a clear glaze coat if necessary or finished with a fixative sealant. The skills learned in this unit are:

- Opaque stain application
- Making advanced brush strokes

Suggestions

1. Before choosing your piece, and if you have the opportunity, go to several ceramic studios to see what is available.
2. Refer to websites and ceramic publications for technique ideas.
3. You may want to change your piece by alternating the design of the greenware.
4. Be sure to stay within your unit medium (unfired finishes).
5. Keep accurate notes as you proceed.

Steps

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using techniques from units 1, 2, 7, 8, or 9.
2. Follow the cleaning steps.
3. Decide on the technique you wish to achieve.
4. Complete your ceramics e-record.
5. Evaluate your piece, using the guideline.

Guidelines for Judging Your Project

- Finish is suitable to use (Do not use unfired finishes on dishes or cups meant for food.)
- Shows no brush marks
- Stain detail work and color enhance basic design
- Color combinations are pleasing and appropriate to the item
- Items needing to be sealed may be sprayed, brushed on, or rubbed
- Colors under antiquing should be bright and clear
- Any stenciled design should be sharp

Glazes

Image Source: https://s3-us-west-2.amazonaws.com/reference/images/pictures/hjggfcq4x2.png

Unit 5

Project Requirements

Create one functional or decorative art piece that is at least 4” in width or height and no larger than 12” in width or height using basic reactive glaze technique(s). The art piece may be either purchased in greenware, bisqueware or a hand-constructed piece created by the member. Judging will primarily be on the quality of glaze application and firing techniques.

- Enter the Glazes Hand Constructed class if the exhibit item was made by the member.

- Enter the Glazes Purchased Greenware/Bisque class if the exhibit item was purchased by the member.

Basic Information

Glazes are usually applied to bisqueware. They may be applied to greenware in certain cases. Follow manufacturer's suggestions. Glazes:

- Require specific application using the correct brush.

- Require different firing temperatures. The temperature that the glaze must be fired to must match the temperature that your clay body can be fired to.

Always read manufacturer's labels for application and firing directions.

Types of Common Glazes

- Gloss (may be opaque, semi-opaque, transparent or semi transparent).
- Art (may be gloss, satin or matte that breaks into two or more colors).
- Crystal (may be gloss, satin or matte that has rock like crystals that melt in the firing).
- Crackle (may be gloss, satin or matte). Antique with an ink thin, dark, satin to enhance crazes.
- Satin (moves very little in firing).
- Matte (does not move in firing).
- Woodgrain (has a soft crystal that must be brushed out to give wood grain effect).
- Textural (creates various textures from very fine to very coarse).
- Special effect (is a "stay put" glaze that can be used under, over or between colored glazes).

Have your project leader, parent and/or ceramic studio owner help you choose your greenware and glazes. They will be able to assist you in your choices and guide you.

Glazes Technique List

Place a check mark in the column of skills you would like to learn. Put the date when you learned the skills in the checklist below. Discuss skills you would like to learn with your leader. She/he will be able to give you hints about how to achieve your goal.

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Removing seam lines and imperfections from the greenware, with the proper tools.		
Altering the greenware pattern for a special effect.		
Application of an opaque gloss glaze with an ox hair or nylon glaze brush.		
Application of a transparent and/or semi-transparent glaze with a nylon glaze brush.		
Application of an art glass glaze with an ox hair or nylon glaze brush.		
Application of an art satin and/or matte glaze with a nylon glaze brush.		
Application of a crystal glass, satin and/or matte glaze/s with a fan brush.		
Application of crackle gloss, satin and/or matte glaze/s with an ox hair or fan brush.		
Application of woodgrain satin and/or matte glaze/s with an ox hair or fan brush.		
Application of a textural glaze using a brush, paint knife, sponge or other instruments.		

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Application of a special effect glaze using a brush, paint knife, sponge or other instruments.		
Antiquing with glazes.		
Application of a combination of different color glazes, one over another, for a mingled or muiti-colored effect.		
Application of a combination of different color glazes, a deliberate placement of colors, controlling the colors.		
Application of glaze contained within a design area.		
Sgraffito through glaze/s using two or more glaze colors.		
Inlay of glazes into certain areas of pattern.		
Majolica: A glaze decoration over a matte or satin glaze. Limited amount of underglaze for outlining only will be accepted.		

Unit 5 - Glazing Tiles Project 1

Basic Information

Project 1 is designed to be a learning introduction. Project 1 for a member repeating Unit 5 is designed to be a progressive learning experience. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book. Glazes should be purchased, as mixing glazes requires a much more expensive and experienced level of training that involves handling powder form chemicals that must be measured and weighed out in very specific recipes that should only be done by a professional. Activity items, such as tiles, functional pieces, and your exhibit piece can be either made or purchased.

- This piece will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book.

- In this project you will purchase your basic brushes, tools, greenware or bisqueware (if desired) and paint. Repeating members will need to learn the use of new brushes, tools and techniques.

- You will be learning many new ceramic terms from your leader and/or the glossary at the end of this manual.

Steps

1. Purchase or make two 4- or 6-inch square slab tiles. One tile could be textured and one could be smooth in order to display application techniques.
2. Prepare a work area with suitable covering.
3. Follow the safety rules.
4. Clean tiles using proper tools.
5. Initial and date the tile on the bottom for identification. This is a requirement.
6. Senior and/or repeating members may leave the tiles in greenware form and go to the next step.
7. With a pencil, divide each tile into four sections. Using a sgraffito tool, incise the pencil lines. Be creative!
8. Bisque-fire your tiles according to the glaze label firing instructions.
9. Keep accurate notes as you proceed.
10. Prepare your work area with suitable covering.
11. Remember the safety rules.

Unit 5 - Glazing Tiles Project 1

Steps Continued

12. Using a damp sponge clean kiln dust from your tiles.
13. Senior/repeating members will choose two or more different glazes. Using your knowledge of the color wheel, choose the colors you would like for your tiles. Your leader will guide you.
14. Apply the recommended number of coats of glaze, as stated on the glaze label, on your tiles. Be sure each coat is dry before applying the next coat. Be sure NOT to glaze the bottom of your tiles so that you glaze does not fuse your tiles to the kiln shelf in the firing process. The bottom of each tile should be clean and flat. You can wax the bottom and sides of your tiles to ensure your glaze does not get on them.
15. Have your pieces fired to the glaze label recommended cone size.

Unit 5 - Glazing Functional Pottery Project 2

Basic Information

Project 2 for the first year member will serve as a functional piece. You may use it as your water cup throughout your ceramic projects. Members repeating this unit may want to do a brush holder or another functional piece of his/her choice. Be creative! Your functional piece may be either made or purchased. Pieces should have some textured areas to observe the glaze on different surfaces when fired on a vertical standing object as opposed to a tile that lays flat. Use up to two glazes only. This is a required learning piece. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book.

Suggestions

For seniors and repeating members:

1. Try design work by using glazes over a Matte or Satin glaze. This is called a Majolica technique.
2. Seek more techniques from ceramic publications and/or your local ceramic studio.
3. Try one of the skills on the glazes technique list provided in the beginning of this unit.

Unit 5 - Glazing Functional Pottery Project 2

Steps

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.
2. Prepare a work area.
3. Remember the safety rules.
4. Carefully clean seam lines from your greenware with proper tools. The circumference of the cup lip must be the same width all the way around. This is accomplished as you smooth the rim.
5. Have your piece bisque fired according to the label instructions.
6. Keep accurate notes as you proceed.
7. Clean the bisqueware piece with a damp sponge and let it dry completely, apply a wax resist or do a hot wax dip to the bottom of your piece. Make sure the wax completely covers the bottom and comes up the sides about ⅛" to ensure the clear coat glaze does not get applied too low on the sides of the piece or any gets on the bottom of your piece because this can cause your piece to stick to the kiln shelf in the second firing.
8. After cleaning your bisque and waxing the bottom of your piece, roll one "rolling coat" of glaze inside your piece. Your leader will help you mix your glaze for a rolling coat. Be sure to leave your piece upside down until dry, resting the rim of the piece on a clean tool or pencil. This will avoid over glazing the inside. Continue by glazing the outside. Be sure each coat is dry before beginning your next coat. You may use the same color/s as you used on the tiles.
9. Fire according to the label instructions.

Unit 5 - Glazes Exhibit Piece

Basic Information

Great! You have completed Projects 1 and 2! Skills you have learned include:

- Proper cleaning of greenware
- Waxing the bottom of your piece
- Application of glaze of your choice
- Rolling glaze inside a piece
- Butting (or melting) two glazes

You are now ready to complete Project 3 which may be your exhibit piece. If time permits, you can complete several projects. You may want to do an evaluation on each of your pieces that are exhibit considerations. This would let you determine which would be your best piece for exhibit. You may glaze either a made or purchased functional OR decorative art piece with up to two colors completed in the firing process, displaying at least one of the learned glaze applications.

Suggestions

1. You may use the same skills learned on your third project or refer to the glaze technique checklist to learn and complete a new skill.
2. Before choosing your project piece, and if you have the opportunity, go to several ceramic studios to see what is available.
3. Look through ceramic publications for technique ideas.
4. Be sure to stay within your unit medium (glaze).
5. You may want to change your piece by carving a design into the dry greenware or by cutting a design into wet greenware. You may change the design of your piece as you like. This is considered a greenware adaptation, but is still within your unit if you use glaze as your medium. Be sure the greenware is casted a little heavier than normal. Extra care will be needed because there is a degree of risk in breakage. This is not recommended for ages 8 through 13 years, but would be an excellent technique for senior members.

Unit 5 - Glazes Exhibit Piece

Steps

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.

2. Follow cleaning greenware steps as outlined on page 34.

3. Decide on the technique you wish to achieve. Your leader will guide you. If you do not have a ceramic project leader, contact your Extension Specialist so she/he may be able to connect you with a local project leader or a knowledgeable person. If neither is available, you can research what you want to know on the Internet, at a library, or ask staff at a ceramics supply store.

4. Keep accurate notes as you proceed.

Guidelines for Judging Your Project

Basic Glaze:

- Color and texture enhance the item
- Smooth and even in color
- Clear, not cloudy from application of too much glaze
- Not speckled from floating glaze in kiln
- Adequately cleaned and sanded bottom as explained on page 20
- Type suitable to use (i.e., lead-free glazes for pieces that will contain food or drinks)

Satin, Matte, and Woodgrain Glazes:

- Satiny, soft, smooth finish
- Woodgrain should give a wood-like appearance
- Enhances overall design of item
- Shows minimum stilt marks

Overglazes

Image Source:
https://www.galleryjapan.com/element/main_rwd/technique/images/kv_dtl_ceramics_overglazeenamel_sp.jpg

Unit 6

Project Requirements

Create one functional or decorative art piece that is at least 4" in width or height and no larger than 12" in width or height using overglaze techniques. The art piece may be either purchased greenware, bisqueware or a hand-constructed piece created by the member. Judging will primarily be on the quality of overglaze application and firing techniques.

- Enter the Overglazes Hand Constructed class if the exhibit item was made by the member.
- Enter the Overglazes Purchased Greenware/Bisque class if the exhibit item was purchased by the member.

Basic Information

Overglazes are usually applied over a glaze. They may also be applied over polished Porcelain bisque. Overglazes are mostly used for decorative purposes. Most overglazes, fuse to, but do not become part of the glaze. For that reason, they are mainly used for decorative rather than utility items. Check with the manufacturer for food safe information.

Types of Common Glazes

1. Lusters:
   a. Gold
   b. Platinum
   c. Copper
   d. Mother of pearl
2. Decals
3. Enamel
4. China paste
5. China paint

It is very important to read all labels for recommended application and firing instructions. Have your project leader, parent and/or ceramic studio help you choose your greenware and overglazes. They will be able to assist you in your choices and guide you. Keep accurate notes as you proceed. Evaluate each of your projects using the guide for judging.

Image Source: https://ceramicartsnetwork.org/images/default-source/uploadedimages/wp-content/uploads/2019/01/kane-tolosa-finished-01-1.jpg?Status=Master&sfvrsn=9c8fb49d_0

Overglaze Technique Checklist

Place a check mark in the column of skills you would like to learn. Put the date when you learned the skills in the checklist below. Discuss skills you would like to learn with your leader. She/he will be able to give you hints about how to achieve your goal.

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Altering the greenware pattern for a special effect.		
Making my own design using several decals.		
Combing several overglazes.		
Application of enamels.		
Application of China paste.		
Application of China paint.		
Application of an overglaze not listed. Name of overglaze:		

Unit 6 - Overglaze Decals and Mother of Pearl Project 1

Basic Information

You will be learning how to apply a decal and Mother of Pearl. Most decal designs are made with China paint and/or enamels on a film. The film fires away and the design fuses onto the glaze. You may try these techniques on two separate pieces or on one piece (purchased or made by you). If using decals and Mother of Pearl on the same piece, always apply and fire the decal first. Decals require a hotter firing than the Mother of Pearl application.

Repeating members and seniors may create an original design using a variety of different patterns and sizes when using decals. This project will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book. You will learn more new ceramic terms from your leader. Tools and brushes you may need to purchase:

- Turntable to aid you when you are applying lusters.
- A fumes and dust respirator mask.
- A squeegee for applying decals.
- A brush for Mother of Pearl application ONLY

Image Source: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcT8A0KG_zIDz0hsSUbsamdKTaU7RFYbT--Lbg&s

Steps for Decals

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.
2. Prepare a work area with a suitable surface or covering.
3. Follow the safety rules.
4. Clean greenware. Initial and date the bottom of the piece, and fire to the proper cone.
5. Keep accurate notes as you proceed.
6. After cleaning the kiln dust from the piece, wax the bottom of your piece then apply a glaze of your choice as a base color. No more than two colors should be used on your piece for the base of your piece.
7. Clean your brush with soap and water. Rinse and reshape the brush.
8. Fire your piece to the proper cone size.
9. Clean the piece to be decorated with denatured alcohol.

Unit 6 - Overglaze Decals and Mother of Pearl Project 1

Steps for Decals Continued

10. Consider the placement of your decal(s) and make a plan for where you want to place it/them on your piece, you can mark the spot with a small dot in non-permanent marker just above the area where you want to place it/them if you would like.
11. Place the decal in water until the decal curls up tightly. The water should be room temperature or lukewarm.
12. Remove the decal from the water and place on the clean glazed piece until the decal unfurls.
13. With the backing paper still in place, position the decal face up on the piece. Holding the decal in position with your thumb, gently slip out the backing paper.
14. If you are having a problem removing the backing paper, ask your leader for helpful suggestions.
15. Slide the squeegee over the backing paper to remove some of the adhesive. This will let the squeegee slide across the decal without tearing it. Work out all of the water and air bubbles, working from the center out, in all directions.
16. Repeat the above steps if you are putting more than one decal on your piece.
17. Clean the squeegee with soap and water, rinse and let it dry.
18. Allow the decal to dry twelve hours before firing. Read decal packaging for proper firing cone temperature.
19. Complete your e-record and expense supplement sheets.
20. Evaluate your project using the Unit 6 guideline for judging.

Steps for Mother of Pearl

1. Wash your Mother of Pearl application brush with soap and water at home so it has time to dry before the next workshop. Label your brush "Mother of Pearl."
2. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9. You may also use the same piece you applied your decal(s) on if desired (if you choose this option skip to step 10).
3. Prepare a work area with a suitable surface or covering.

Unit 6 - Overglaze Decals and Mother of Pearl Project 1

Steps for Mother of Pearl Continued

4. Follow the safety rules.
5. Clean greenware. Initial and date the bottom of the piece, and fire to the proper cone.
6. Keep accurate notes as you proceed.
7. After cleaning the kiln dust from the piece, wax the bottom of your piece then apply a glaze of your choice as a base color. No more than 2 colors should be used on your piece for the base of your piece.
8. Clean your brush with soap and water. Rinse and reshape the brush.
9. Fire your piece to the proper cone size.
10. Clean the piece to be decorated and your brush with the denatured alcohol and/or essence and let dry.
11. Wear a proper respirator mask as well as rubber gloves, plastic wrap or a paper towel while handling the piece and placing it on a turntable while working with the Mother of Pearl medium.
12. Load the brush with Mother of Pearl, clean one side of the brush on the side of the bottle, to remove excess. The brush should not be loaded to the metal ferrule.
13. With a light touch, swirl the Mother of Pearl in a small circular motion. The Mother of Pearl is typically dyed a blue coloring so you can see your application. Turn the turntable as you work.
14. Reload your brush when needed. Do not over-work the brush strokes. Let the piece dry twelve hours before firing to proper cone (follow manufactures instructions). Be sure to use paper towels or wear gloves when moving the dry Mother of Pearl piece. Ask your leader to give you more information if needed.
15. Clean your brush in clean essence, then alcohol and finally with soap and water. Store this brush away from your other brushes.

Image Source: https://preview.redd.it/iridescent-shimmery-glazes-i-am-a-total-beginner-here-but-v0-6wx80o5l0fb61.jpg?width=1077&format=pjpg&auto=webp&s=94eba38f95f8b6f1e8a6544ff132ac2b2c547169

Unit 6 - Overglaze Enamel and Lusters Project 2

Basic Information

In this project you will learn how to apply enamel overglazes and lusters to a piece that is already glazed. You may try these techniques on two separate pieces or on one piece (purchased or made by you). Enamel overglazes are made of powdered glass and pigments that you typically mix with an oil or other type of liquid medium and brush onto glazed pottery. Lusters are typically fine ground minerals and metals that can be applied with certain mediums to add details and accents to a piece. Enamels and lusters have been used for centuries in jewelry and pottery originating in Asia. You can look up some of the traditional styles and uses on the internet to help inspire you how to use it on your piece. This project will be considered as one of your required pieces. Learning projects are usually not entered in competition. Be sure to include pictures of this activity in your record book. Tools and brushes you may need to purchase:

- Turntable to aid you when you are applying lusters.
- A fumes and dust respirator mask.
- Select a variety of soft synthetic brushes (nylon or polyester) for water-based enamel paints, or natural bristle brushes (goat or squirrel hair) for oil-based enamels.
- Plastic paint palette for mixing enamel paints.
- A dedicated natural haired brush or soft synthetic brush for lusters. Lusters require dedicated brushes for each luster used to avoid cross contamination as other materials can ruin your metallic finishes.

Image Source: https://ceramicartsnetwork.org/images/default-source/uploadedimages/wp-content/uploads/2018/08/kane-tolosa-04.jpg?sfvrsn=a59e897f_0

Unit 6 - Overglaze Enamel and Lusters Project 2

Steps for Enamels

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.
2. Prepare a work area.
3. Follow the safety rules.
4. Clean the greenware as outlined. Initial and date the bottom of the piece and then fire to proper cone temperature.
5. Keep accurate notes as you proceed.
6. After cleaning the kiln dust from the piece, wax the bottom of your piece. Next, apply a gloss glaze or other base glaze of your choice depending on your piece, with your glaze brush. No more than two colors should be applied for your base colors.
7. Clean your brush with soap and water. Rinse and reshape the brush.
8. Fire the piece to the proper cone size.
9. Wash the new enamel dedicated brush(es) with soap and water and then wash with denatured alcohol and/or essence at home so it has time to dry before the next workshop. Label your brush(es) “Enamel Only".
10. Prepare a design for your piece that you want to apply with your enamel paints.
11. Prepare a work area.
12. Clean the glazed piece and let it dry.
13. Prepare your enamel paints by putting the pigmented powders in individual sections of the paint pallet and then mixing them with the proper ratio of water or oils based on the instructions from the manufacturer.
14. Carefully paint on your design keeping in mind the knowledge you have learned from the Ceramics Elements and Principles of Designs from the beginning of this book, the color wheel exercise for mixing, and your planned out design as a blueprint for applying your design to the piece.
15. Fire your piece for a third time at the proper temperature as suggested by the manufacturer.
16. Clean your brush(es) in clean essence, then with denatured alcohol and finally with soap and water. Store these brushes, alone, away from your other brushes to avoid cross contamination.
17. Complete your e-record project and expense supplement sheets.
18. Evaluate your project using the Unit 6 guidelines for judging.

Unit 6 - Overglaze Enamel and Lusters Project 2

Steps for Lusters

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9. You may also use the same piece you applied your enamels on if desired (if you choose this option skip to step 9).
2. Prepare a work area.
3. Follow the safety rules.
4. Clean the greenware as outlined. Initial and date the bottom of the piece and then fire to proper cone temperature.
5. Keep accurate notes as you proceed.
6. After cleaning the kiln dust from the piece, wax the bottom of your piece. Next, apply a gloss glaze or other base glaze of your choice depending on your piece, with your glaze brush. No more than two colors should be applied for your base colors.
7. Clean your brush with soap and water. Rinse and reshape the brush.
8. Fire the piece to the proper cone size.
9. Wash the new Lusters dedicated brush(es) with soap and water and then wash with denatured alcohol or essence at home so it has time to dry before the next workshop. Label your brush(es) “Lusters”.
10. Clean the glazed piece and let it dry.
11. Wear a proper fumes and dust respirator mask as well as rubber gloves, plastic wrap or a paper towel while handling the piece and placing it on a turntable while working with any luster mediums.
12. Apply the luster medium of your choosing to your piece with detail and care to add an elevated touch of elegance to your piece.
13. Fire your piece at the proper temperature as suggested by the manufacturer.
14. Clean your brush in clean essence, then alcohol and finally with soap and water. Store this brush away from your other brushes.
15. Complete your e-record project and expense supplement sheets.
16. Evaluate your project using the Unit 6 guidelines for judging.

Unit 6 - Overglazes Exhibit Piece

Basic Information

Fabulous!! You have completed Projects 1 and 2. You are ready to create your Project 3 which may be your exhibit piece. The skills learned in this unit include:

- Decal application
- Application and proper use and handling of lusters
- Application and use of enamels
- Mixing ratios for overglaze mediums

You may use one of these skills by themselves or in combination. If you are having a hard time deciding, ask your parent, leader, or local ceramic studio for advice.

Suggestions

1. Before choosing your piece, and if you have the opportunity, go to several ceramic studios to see what is available.

2. You may want to change your piece by alternating the design of the greenware.

3. Refer to ceramic publications and websites for technique ideas.

4. You might want to obtain information from your local library.

5. Be sure to stay within your unit medium (overglazes).

Steps

1. Select suitable greenware or bisqueware (small figurine, vase or plate) or make a piece using the techniques from units 1, 2, 7, 8, or 9.

2. Follow cleaning greenware steps as outlined on page 34.

3. Decide on the technique you wish to achieve.

4. Clean, wax the bottom, glaze and fire your piece appropriately following the steps you have learned in the overglaze projects.

5. Complete ceramics e-record. Include Learning Projects on the specific information page:
   - Proper application of decals
   - Proper application of Mother of Pearl

6. Evaluate your piece using the Unit 6 guidelines for judging. Ask your leader for help.

Guidelines for Judging Your Project

Show Creativity and Originality
Judges will consider your age, experience, and techniques used when they are judging your project for creativity and originality.

Clean-up and Construction – no larger than 4" x 12"
Judges will look at the following construction characteristics of your exhibit:

- No evidence of seam lines or imperfections;
- All drip marks removed any drip marks that were stuck to the kiln shelf and had sharp edges have been grinded off and smoothed out
- Piece sits evenly on table, stilt marks removed (felted or smooth)
- The bottom of piece is clean and smooth with no signs of sticking to the kiln shelf
- No nicks, chips, or rough areas
- Lids fit
- Thickness of piece and rims are even

Appearance of finished product – glaze techniques
Judges will look at the following finishing characteristics of your exhibit:

- Proportion and balance of design
- Glaze should not have pinholes
- Should be clear not cloudy
- No unwanted crazes or cracks
- Glaze should have an even application—no streaks
- No rough areas or dust pockets; design should not appear too small or too large
- All vessels need to be finished inside, bottom and/or pour gate need to be finished
- Does glaze enhance the piece?
- Artistic Elements: Color
- Value – Good dark/light balance
- Intensity – Good contrast between bright and dull areas
- Harmony – Pleasing arrangement of colors that work well
- Relation to Design – Does color enrich design? Is it an important part of the design?
- Appropriate for either functional or decorative use

Sculpture

Image Source: https://www.gilaridgeceramics.com/uploads/4/5/0/3/45034245/newr.jpg?425

Unit 7

Project Requirements

Create one decorative art ceramic sculpture that is at least 4" in width or height and no larger than 12" in width or height. The project should be fully glazed and complete. If it is meant to be hung for display, there should be a string, wire, hook or other way to display the item hung as part of the piece.

Basic Information

There are many techniques to explore using clay as a medium for sculpture. Clay is an awesome medium because you can pinch, roll, carve, build, and shape it into almost anything. Many of the hand building skills you have learned in the Ceramics Units 1 and 2 can be applied to the Sculpture unit by pinching, coiling, slab building, carving, or adding clay to build up shapes and details.

For a sculpture that is meant to be hung on the wall, be sure to incorporate a way to securely hang your wall hanging sculpture into your design. For hanging, a loop or holes must be incorporated into the clay while it's still soft, and the piece must be properly fired before being hung with wire, cording, or adhesive hangers. Key considerations include using lightweight materials, ensuring pieces are not too thick, and being sure your scoring and slipping is secure when joining clay parts. There are three learning projects to choose from in this unit, but you only need to complete the two of your choice.

Image Source: https://ceramicartsnetwork.org/daily/article/Clay-on-the-Wall-An-Introduction-to-Hanging-Ceramic-Wall-Pieces

Types of Sculpture

- **Free-Standing Sculpture:** Also known as "in the round," this form is fully three-dimensional and designed to be viewed from multiple angles. Famous examples include Michelangelo's "David" and Rodin's "The Thinker".

- **Relief Sculpture:** A technique where the sculpture is raised from but still attached to a surface and typically viewed from one angle. Bas-relief (aka low relief) is if it is only slightly raised from the surface and high relief if it's further away and more defined from its background.

- **Bust Sculpture:** depicts the head (and sometimes shoulders and chest) of a person.

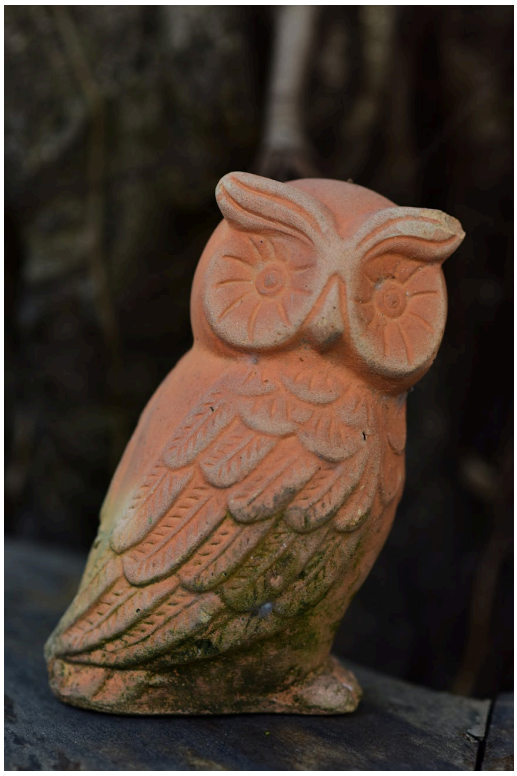
Types of Sculpture

- **Figurine:** A small statue. Figurines with movable parts are more commonly referred to as dolls or mannequins.

- **Monument or Memorial:** A single sculpture or group of sculptures designed to commemorate a significant person or historical event.

- **Kinetic Sculpture:** This type incorporates movement as part of its design, often through mechanical elements or natural forces like wind. Alexander Calder's mobiles are iconic examples of kinetic sculpture.

- **Installation Art:** Installation sculptures involve assembling various elements within a space, creating immersive experiences for viewers. It's often site-specific and designed to interact with its environment, such as Yayoi Kusama's mirror rooms.



Images Source: Pinterest

Source for content:
https://www.futurelearn.com/info/courses/introducing-art-history-discovering-public-sculpture/0/steps/97394
https://artsology.com/blog/2024/10/sculpture-101-types-techniques-and-the-best-materials-to-use/

Sculpture Technique List

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Pinch Building: Great for bowls, faces, creatures, and small sculptures.		
Coil Building: Great for tall sculptures, big shapes or hollow forms.		
Slab Building: Great for boxes, tiles, walls, geometric sculptures.		
Additive Sculpting: Adding clay to create things like noses, ears, scales, armor, muscles, texture.		
Carving (subtractive): Scraping or cutting clay away to create details, great for fur textures, scales, patterns, carving designs, subtracting mass.		
Hollowing: Removing clay from the inside so sculptures don't crack or explode when fired, great for any sculpture thicker than your thumb.		
Slip Casting: Pouring liquid clay (slip) into a plaster mold, great for making multiples, smooth bases, or shapes to carve and alter.		
Texture and Surface Techniques: Includes stamping, pressing objects (leaves, fabric, buttons), carving lines (sgraffito), adding thick slip for raised texture, great for backgrounds, clothing textures, scales, feathers, patterns.		
Press Molding: Pressing clay into a shape or form, great for repeating shapes, quick forms, ornaments, reliefs.		

Unit 7 - Sculpture Animal Project 1

Basic Information

Tools and materials needed:

- Prepared clay (the amount that your sculpture will need)
- Loop tools
- Modeling tools
- Cleaning tools and sponges
- Needle tool for scoring
- Slip/slurry to attach pieces
- Spray bottle, or water in a small cup (for smoothing) and keeping your clay from drying out too quickly
- Rags and plastic for covering and storing
- Canvas, burlap or newspaper material (to keep the area clean)
- Paints/Glazes and brushes for decoration

As your skills improve, sculpture is one area where you can let your imagination go wild.

Steps

A dinosaur (or any animal) is a good subject for this technique.

1. Prepare your workspace by laying down the canvas, burlap, or newspaper material to protect the table. Gather all your materials so they're easy to reach.
2. Sketch out a design of your idea with measurements and any other details noted so you can keep to your plan as much as possible.
3. With a well-prepared (wedged and seasoned) ball of clay, shape it to resemble the body.

4. Turn it upside down and remove the clay from the center with your loop tools.
5. Keep the wall thickness under 1/2" thick. If you have air bubbles in our clay or have the wall too thick, it is likely to explode in the firing process.
6. After body preparation, you can make coils and shape them into tail, neck, head, and feet.
7. Attach them to the body, using the scoring and slurry/slip method. Be sure to press the "add-ons" securely to remove air pockets. If possible, add a thin coil around the attachment area and smooth it out over the seam where the attachment was made to help reinforce the bond of the two parts.

Unit 7 - Sculpture Animal Project 1

Steps Continued

8. Scales and other raised textures can be made by pinching and shaping small balls of clay and attaching them to the dinosaur's back or the body of the animal you are creating in a layered pattern working around the figure and moving all the way down (or up) the body. Remember when attaching any "add-ons", make sure you do not trap air bubbles or you might have a dinosaur or animal without some of its body parts.
7. Inscribed textures can be made with scratching tools or ball tipped tools by pressing into the figure and slightly carving away or pressing into the clay to create low relief textures in the clay.
8. Let your piece dry by placing the mask on a flat surface and loosely covering it with a plastic covering so that your piece does not dry out too quickly or unevenly which can cause cracking (usually 24–48 hours depending on clay thickness).
9. Decorate/Glaze your piece. You need to decide how you want to decorate your piece. You can use any of the glazing methods found in Units 3-6 of this manual or have your leader or instructor help guide you with the decoration of your piece. Once your piece is decorated with the glaze technique of your choice and fired appropriately. Have fun and be creative!

Unit 7 - Sculpture Face Project 2

Basic Information

Tools and materials needed:

- Prepared clay (the amount that your sculpture will need)
- Modeling tools
- Cleaning tools and sponges
- Two strips of wood approximately 1/2" thick and 12"-24" long
- A wooden rolling pin
- Needle tool for scoring
- Slip/slurry to attach pieces
- Plastic knife or clay tools
- Spray bottle, or Water in a small cup (for smoothing) and keeping your clay from drying out too quickly
- Canvas, Burlap or Newspaper material (to keep the area clean)
- Paints/Glazes and brushes for decoration

Steps

1. Prepare your workspace by laying down the canvas, burlap, or newspaper material to protect the table. Gather all your materials so they're easy to reach.
2. Sketch out a design of your idea with measurements and any other details noted so you can keep to your plan as much as possible.
3. Roll out your clay into a slab about ½ inch thick as directed in the drape shape section of Unit 1. Cut out an oval or circle. This will be the base of your mask.
4. Shape the mask using your fingers or a plastic knife to smooth the edges. If you want a face shape, gently pinch the sides to make a chin or cheekbones.
5. Add facial features by rolling out small pieces of clay for the nose, lips, and eyebrows. Attach them by scoring both sides and adding slip. Be sure to blend the edges so they stick on well and the attachment area (seams) looks clean and smooth.
6. Create eye holes using a tool or your finger to make two holes for eyes. You can also add texture for hair or patterns using a scratching tool, a ball tipped tool or even a toothpick.
7. Smooth the surface by dipping your finger in water and gently smoothing out cracks or rough spots. You can also spray your piece with a spray bottle and use your finger or a small sponge to smooth out areas.

Unit 7 - Sculpture Face Project 2

Steps

8. Design a hanging structure if the mask is meant to be a wall hanging. Attach clay loops on the back, which can be used for hanging themselves or to attach wire and hang by the wire after firing is completed.
9. Let your piece dry by placing the mask on a flat surface and loosely covering it with a plastic covering so that your piece does not dry out too quickly or unevenly which can cause cracking (usually 24–48 hours depending on clay thickness).
10. Decorate/Glaze your piece. You need to decide how you want to decorate your piece. You can use any of the glazing methods found in Units 3-6 of this manual or have your leader or instructor help guide you with the decoration of your piece. Once your piece is decorated with the glaze technique of your choice and fired appropriately. Have fun and be creative!

Unit 7 - Sculpture Flower Project 3

Basic Information

Create a basic flower sculpture by using two different colors of clay. For example, you could use a white porcelain and a darker or lighter shade of colored porcelain. You can make colored clay by mixing a pigment into the clay. You can find more detailed instructions on how to do this by speaking to a clay supply store, researching on the internet, and/or talking to your leader or instructor about it. The picture to the right shows Linda Southwell's piece titled Wall Flower After Aeoniums made of black porcelain and porcelain with body stains. This activity is adapted from the article, How to Make a Delicate Flower Sculpture with Colored Porcelain Clay by Linda Southwell, Ceramics Arts Network, April 30, 2025.

Activity and image source: https://ceramicartsnetwork.org/daily/article/how-to-make-a-delicate-flower-sculpture-with-colored-porcelain-clay

Tools and materials needed:

- Prepared clay (the amount that your sculpture will need)
- Pigments to make colored clay or purchase colored clay (optional)
- Modeling tools
- Cleaning tools and sponges
- Needle tool for scoring
- Slip/slurry to attach pieces
- Plastic knife or clay tools
- Spray bottle, or Water in a small cup (for smoothing) and keeping your clay from drying out too quickly
- Canvas, Burlap or Newspaper material (to keep the area clean)
- Paints/Glazes and brushes for decoration

Unit 7 - Sculpture Flower Project 3

Steps

1. Select suitable clay of two different colors. Tip: you can mix colored clay with white clay to get a more pale color.
2. Prepare your workspace by laying down the canvas, burlap, or newspaper material to protect the table. Gather all your materials so they're easy to reach.
3. Sketch out a design of your idea with measurements and any other details noted so you can keep to your plan as much as possible.
4. Follow the safety rules.
5. Keep accurate notes as you proceed.
6. Join two pinchpots (you can follow the steps in unit 1 to make a pinchpot) by scoring and slipping them together to make a round ball shape that is hollow and lighter weight.
7. On the bottom pinch pot, score two holes for a hanging wire to be threaded through the back of the piece for hanging.
8. On the top pinch pot, score one hole in the center. Do not cover this hole when you start adding petal pieces to the pot around the center hole.
9. Roll coils of different colored clays in increasing thickness. Start with the lighter colored clay as the thickest coils, the medium sized coils should be a bit dark and the thinnest coils be in the darker colored clay.
10. Cut the coils into one half to one inch pieces.
11. Smooth each piece of clay between your fingers and then flatten and shape the piece to resemble a flower petal. Important: Leave one end of each petal thicker to slip into the ball shape.
12. Make about 30 to 60 large petals out of the thicker coil pieces (lightest colored clay).
13. Make about 15 to 30 medium petals out of the middle sized coil pieces.
14. Make about 10 to 20 smaller petals out of the thinner coil pieces (darkest colored clay).
15. Allow the petal pieces to firm up so they hold their shape.
16. Score the thicker end of all the petals with a potter's knife.
17. Score the ball shape around the pierced hole and add slip.
18. Apply slip to the bottom thicker end of the smallest petals and attach around the pierced hole, smoothing into place.
19. Stagger how you attach the next ring of petals so they fill the gap between the two petals on the inside as you add petals.
20. After the second or third ring, switch to the medium petals. Add two or three rings.
21. Before adding the larger outer petals, transfer your work onto a kiln shelf so it is easier to move (if possible). Use a wooden bat or tray if you can't use a kiln shelf.

Unit 7 - Sculpture Flower Project 3

Steps Continued

22. Finally, add the largest and lightest colored petals.
23. Use a soft, wet brush to clean any bits off.
24. Dry the sculpture slowly and under plastic at first to prevent cracking.
25. Once fully dried, fire to the recommended temperature for your clay.
26. Decorate/Glaze your piece. You need to decide how you want to finish your piece. If you're using colored clay as suggested, you may only want to add a clear coat glaze or a finish such as a varnish to your piece to show off the colored clay body. You may also use any of the glazing methods found in Units 3-6 of this manual or have your leader or instructor help guide you with the completion of your piece. Once your piece is decorated with the glaze technique of your choice and fired appropriately. Have fun and be creative!

Unit 7 - Sculpture Exhibit Piece

Basic Information

Now is your chance to let your imagination run wild! It is a good idea to draw some pictures on paper of what you are thinking of sculpting before you start working with clay. That way, you have a good idea of what you want to make before you get out all your supplies.

Tools and materials needed:

- Prepared clay (the amount that your sculpture will need)
- Modeling tools
- Cleaning tools and sponges
- Needle tool for scoring
- Slip/slurry to attach pieces
- Plastic knife or clay tools
- Spray bottle, or Water in a small cup (for smoothing) and keeping your clay from drying out too quickly
- Canvas, Burlap or Newspaper material (to keep the area clean)
- Paints/Glazes and brushes for decoration

Steps

1. Draw out your idea(s) of what you would like to create as your exhibit sculpture. This is a great time to decide which techniques you want to use to build your sculpture.
2. Decide what glazing techniques you will use (if any).
3. Select suitable clay.
4. Prepare a work area with suitable covering.
5. Follow the safety rules.
6. Keep accurate notes as you proceed.
7. Create your sculpture.
8. Dry the sculpture slowly and under plastic at first to prevent cracking.
9. Once fully dried, bisque fire to the recommended temperature for your clay.
10. Apply glazes, or a finish to your piece.
11. Fire again to the recommended temperature for your glaze.
12. Complete your e-record and expense supplement sheets.
13. Evaluate your project using the Unit 7 guideline for judging.

Guidelines for Judging Your Project

Judging ceramic sculpture involves looking at both artistic quality and technical craftsmanship. Below are the core areas evaluators typically use.

Craftsmanship & Techniques

Judges look for:

- **Structural soundness**
  - No cracks, weak joins, or areas likely to break off.
- **Proper construction methods**
  - Good scoring & slipping, even wall thickness, secure attachments.
- **Surface finishing quality**
  - Smooth where intended, textured where intended, consistent finishing.
- **Control of medium**
  - Clay handled with intention rather than accidental marks.
- **Appropriate firing**
  - Even glaze application (if glazed), no pinholing, crawling, or unintended blistering.

Creativity & Originality

Judges consider:

- Unique concept or approach
- Creative problem-solving
- Personal style or voice emerging
- Innovative use of clay
  - Techniques, textures, mixed media (when allowed), altered forms, etc.

Design & Composition

Judges evaluate:

- Balance & stability (sculpture stands or hangs securely)
- Strong silhouette (visually appealing from all sides)
- Proportion & scale (parts relate well to the whole)
- Unity of parts
  - Elements work together rather than feeling disconnected.
- Visual flow or movement
  - The eye is guided smoothly around the piece.

Expression & Storytelling

Even non-figurative pieces communicate something.
Judges look for:

- Clear idea or theme
- Emotional impact
- Ability to evoke curiosity, feeling, or meaning
- Intentional choices that support the message or mood

Guidelines for Judging Your Project

Surface Treatment

Whether glazed, burnished, slip-decorated, stained, or left unglazed: Judges evaluate:

- Appropriate surface choice for the form
- Evenness and consistency
- Color use and harmony
- Purposeful texture
    - Not random or distracting.
- Highlights, shadows, depth created through surface design.

Technical Difficulty

Judges consider the level of challenge demonstrated:

- Complexity of the form
- Size of the piece
- Intricacy of details
- Use of advanced methods (hollowing, armatures, multi-part construction)
- Risk level (thin appendages, dynamic poses, alternative firings)
- More complexity doesn't automatically mean a higher score—but clean execution of a difficult technique often earns recognition.

Workmanship Cleanliness

Judges look for:

- No unintended fingerprints
- No gouges or accidental dents
- Clean joins with no visible seams (unless intentional)
- Thoughtful finishing of the bottom or edges

Presentation

How the sculpture is displayed also matters:

- Base or stand is appropriate to the artwork
- Sculpture is stable and not leaning unintentionally
- No distracting materials or props (unless integral to the design)

Wheel Throwing

Image Source: https://i.ytimg.com/vi/Ye3kmwwohMY/maxresdefault.jpg

Unit 8

Project Requirements

Create a set of two matching functional pieces, such as two vases, cups, bowls, or plates of equal height, width and shape. Pieces should be trimmed, fully glazed, and complete. The pieces should be at least 4" in width or height and no larger than 12" in width or height.

Basic Information

Wheel throwing is a pottery technique where you shape clay on a spinning wheel. The wheel rotates, allowing you to form bowls, cups, plates, and other items by using your hands and simple tools. It's called "throwing" because you're shaping the clay while it spins — not because you're literally throwing it!

You may have a potter's wheel available to you in school, but if not, you will have to find a potter or a studio who can provide access to a wheel and help you with this project. This is the most challenging technique to master. It takes practice, time and patience to make a piece in which you can be proud of. Evaluate your piece using the judging sheet as a guideline.

Throwing ceramic pieces on a wheel isn't just a skill — it's a way to express yourself. You can create things that are beautiful and useful, like mugs for morning tea or bowls for your favorite snacks. Pottery also helps you relax and focus, making it a great hobby for relieving stress. It also requires a lot of upper body strength and control and teaches you to have patience with yourself. This section of the manual will guide you through the basics of wheel throwing, from preparing your clay to creating your first masterpiece. Let's dive in!

Tips for Beginners

Here are some helpful tips to make your pottery journey easier:

- **Be Patient:**
  It's normal for your first few pieces to look wonky. Practice makes perfect!

- **Start Small:**
  Begin with 1 pound balls of clay attempting simple shapes like bowls or cups before trying more complex designs.

- **Keep the Clay Wet:**
  Dry clay is harder to work with, so keep your hands and the clay moist.

- **Clean Your Tools:**
  Wash your tools and wheel after every session to keep them in good condition.

- **Ask for Help:**
  Don't be afraid to ask your 4-H leader, teacher, or peers for advice. Pottery is a skill that takes time to master.

Tips for Beginners

Centering the Clay:
Be sure when using a pottery wheel that your clay stays centered on the wheel as you work on it.

Speed of the Wheel:
The wheel needs to start out fast (but not too fast) and gradually get slower, which takes practice. Centering your clay is easier if the wheel is spinning more quickly. Once centered, you can gradually slow down the speed of the wheel as you begin to pull the clay. Reduce the speed about three-quarters when opening out and compressing the base, then move to half speed for pulling up the walls. The taller your piece, the slower your wheel needs to turn. Finishing your piece should be done slowly to help it have smooth sides.

Opening the Clay:
Once your clay is centered on the wheel, you will compress your thumbs down into the center slowly. Don't push too hard, or the base of your piece will be too thin and flimsy. The base needs to support the rest of your structure. Let the wheel's rotation help you when opening up the clay. A good way to check if your bottom is too thick or thin is to stop the wheel and use your needle tool to poke straight down through the bottom placing a finger on the needle where the bottom of your piece is and pulling up holding your finger in place to check the thickness of your bottom. If the tip of the needle tool to your finger looks to be about 1 cm or ⅜" thick then you are at a good thickness for your bottom and can begin pulling.

Pulling the Clay:
With one hand on the inside of your pot and the other on the outside, you will begin to pull the walls of the pot up starting from the bottom and steadily and slowly working the clay up. This will begin to thin out the walls and allow you to shape the pot the way you want. This takes many tries and very steady hands. You can use rib tools and sponges to help you achieve the desired texture and shape you are wanting to achieve. The walls of your pot should be around ¼" thick. If the walls are too thin the shape may not hold up and if they are too thick you may run into a lot of shrinkage during the firing process. Watching other potters throw also helps you understand the movements, skills, and techniques you can use to master this step.

Trim and Wire Off the Piece:
Once you have gotten your piece to the desired height and shape that you want, you will need to trim some of the excess clay off the bottom around the outside of the pot. Once you have trimmed it up to your liking, you will wire off the pot. Using the wire tool, hold each handle in each of your hands and pull tension between to make the wire very straight and tight. Then carefully drag the wire along the wheel bat separating the pot from the wheel. If you are throwing on bats that have a small removable center, then you can leave your pot on that center bat

Tips for Beginners

piece and lift it out of the bat and place it on the drying shelf. If you are throwing on a full size bat and do not have extras, you must either carefully lift the pot with as little disturbance to the form as possible and place it on the drying shelf. Or you can use a pot lifter tool to help assist you in getting the pot off the bat and onto the drying shelf.

Trimming the Pot:
Once your pot has dried to a leather hard state, many potters will trim the bottom of their piece to give the pot a beautifully finished and professional look with what we call a foot. A foot typically is a thin raised edge somewhere between a ½" to ⅛" wide that allows your pot to sit level and gives it a very professional looking finish to the form. A foot also aids in glazing, giving your pot the ability to be glazed on the bottom side surface leaving only the foot as the exposed raw clay edge. The foot should also be sanded and smoothed after the piece is completely fired. To create the foot you will need to bring your leather hard pot back to the wheel this time placing it upside down on the bat and centering it. You can buy a special bat that will center and hold your piece in place for you called a Giffin Grip, or you can do it the traditional way by using some raw wet clay pressed gently to the lip of the pot and the bat to hold the bat in place once you have it centered on the wheel. From here you will use a number of trimming tools to carve out the foot, round the side into the bottom, and finish the bottom of your pot. Lastly, you will sign the bottom of your pot before firing it.

Control and Speed:
Throwing on a wheel allows you to have more precise control over the shape and symmetry of your piece. As you become more efficient with your skills throwing on the wheel, you can also create pieces more quickly than when handbuilding.

Mistakes Happen:
Don't worry if your piece collapses. You can recycle the clay and try again! Though it can be frustrating, this is part of the learning process.

Safety First

Pottery is fun, but it's important to stay safe:

- **Protect Your Lungs:** Clay dust can be harmful if inhaled. Always clean up carefully and avoid creating dust.
- **Use the Kiln Safely:** Only trained adults should operate the kiln.
- **Tie Back Long Hair:** This prevents it from getting caught in the spinning wheel.
- **Don't Rush:** Take your time to avoid accidents.
- Never splash water on others.
- Keep fingers away from spinning parts of the wheel.
- Sit up straight and brace your elbows against your body or on your legs for balance.

What You'll Need

Before you start, make sure you have the right tools and materials. Here's a list of essentials:

- **Pottery Wheel:**
  This is the spinning tool where you'll shape your clay. The cost of a pottery wheel depends on its capabilities and features. You may want to take a class before purchasing a pottery wheel to make sure the cost of a wheel is something you want to invest in. Electric pottery wheels are lighter and smaller in size than the kickwheel type that is powered by your foot. Generally, it is easier to use an electric pottery wheel.
- **Clay:**
  Choose a beginner-friendly clay like stoneware or earthenware. Some clays may be too stiff to work well on a pottery wheel. Other clays can be too soft. Consistency is important. If it is too soft, it won't hold its shape and water added to it on the wheel can make it collapse. If clay is too hard, it might be difficult to center on the wheel as you are working with it.
- **Bucket of Water:**
  To keep your hands and clay moist while working. The amount of water you use is very important. If your bowl gets too sticky, it might move off the center of the wheel. If you use too much water, you will lose clay on your hands and waste the material or your piece will not be strong enough to support the structure. Using warm water will ensure your fingers do not get too cold when working the bowl into shape.
- **Pottery Tools:**
  - Sponge for smoothing and shaping the clay
  - Needle tool (for cutting and detail work)
  - Wooden rib (for smoothing and shaping)
  - Wire cutter (to remove your piece from the wheel)
- **Apron or Old Clothes:** Pottery can get messy!
- **Towel:** For drying your hands and cleaning up.
- **Bat:** A removable flat surface that attaches to the wheel, making it easier to remove your finished piece.

Wheel Throwing Technique List

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Wedging: Kneading clay to remove air bubbles and make it smooth and even.		
Centering: Positioning the clay in the exact middle of the wheel so it spins smoothly.		
Coning Up and Down: Pushing the clay up into a cone and back down to improve centering.		
Opening: Pressing into the center of the clay to create the inside space of the form.		
Flooring: Flattening and compressing the bottom of the pot to create a strong base.		
Pinch Pulling: Using fingers to gently squeeze and raise the walls.		
Collaring In: Narrowing the opening by gently guiding the walls inward.		
Widening: Expanding the walls outward to create bowls or rounded forms.		
Compressing the Rim: Squeezing the rim to prevent cracks and add strength.		
Shaping with Hands: Using fingers and palms to form curves and angles.		
Rib Shaping: Using a wooden, rubber, or metal rib to smooth and refine shapes.		
Bellying Out: Creating a rounded or bulbous form in the middle of a pot.		

Wheel Throwing Technique List

Ceramic Knowledge and Goals Checklist	New skills I have learned	Skills I want to learn or improve
Necking: Narrowing the top of a form (common in vases and bottles).		
Creating a Spout: Shaping the rim to form a pouring lip for pitchers or teapots.		
Smoothing: Using a sponge or fingers to remove excess water and smooth the surface.		
Burnishing (on wheel): Polishing the surface with a rib or spoon for shine (on suitable clay).		
Texturing: Adding patterns with tools, fingers, or found objects while the wheel spins.		
Trimming (off the wheel): Removing excess clay from the base once the pot is leather-hard.		
Foot Ring Trimming: Carving a raised ring on the bottom for balance and style.		
Throwing in Sections: Making large forms by stacking thrown pieces.		
Throwing Off the Hump: Creating small items from a larger mound of clay.		
Attaching Handles: Pulling and attaching handles to mugs or pitchers.		
Altering: Changing a round form into oval or faceted shapes after throwing.		
Cutting Off the Wheel: Using a wire tool to safely remove finished pieces.		

Unit 8 - Wheel Throwing Bowl Project 1

Basic Information

Creating a simple bowl is one of the best projects for beginner potters learning to use a potter's wheel. It teaches you essential skills like centering, opening, pulling walls, and shaping — all while creating something functional and beautiful. Follow these steps to make your first pottery bowl!

Steps

Step 1: Prepare Your Clay

Before you start, you need to wedge your clay. This means kneading it to remove air bubbles and make it smooth. Air bubbles can cause your piece to crack in the kiln, so it's important to do this step carefully.

1. Wire cut and weigh out several (3-5) 1-1.5 lb blocks of clay from your pugged wet clay bag. This way you will have multiple balls of clay seasoned and ready to throw if you make a mistake and need to start over or if you have time to make more than one pot.
2. Wedge the Clay: Press, fold, and roll the clay repeatedly on a clean surface. Imagine you're kneading dough for bread! Repeat this on all the cut out blocks of clay you prepared.
3. Shape the Clay: Form the clay into a ball. This makes it easier to center on the wheel. Repeat this for all the cut out blocks of clay and store the extras in a plastic bag or air thighs container.

Step 2: Center the Clay

Centering is the most important skill to learn when throwing on a wheel. If your clay isn't centered, your piece will wobble and be difficult to shape.

1. Attach the Clay: Slam your ball of clay firmly onto the center of the wheel. Pat it down so it sticks.
2. Wet Your Hands: Dip your hands in water and start spinning the wheel at a medium-fast speed.
3. Center the Clay:

- Use your hands to push the clay down and towards the center of the wheel.
- Apply steady pressure with the heel of your palms and fingers to keep the clay in a perfectly balanced and centered position.
- Increase the speed of the wheel as you gain control.

Unit 8 - Wheel Throwing Bowl Project 1

Steps Continued

Step 3: Open the Clay

Once your clay is centered, it's time to create the opening. It is important to have a solid brace position with your elbows tucked in. Experiment with the height of your wheel to find the most comfortable and stable position for working the clay on the wheel. The speed of the wheel is also important to help you maintain control.

1. Use Your Thumbs: Press your thumbs into the center of the clay ball while the wheel spins. Push down gently to create a hole.
2. Shape the Opening: Gradually widen the hole by pulling your fingers outward. This creates the base of your piece.
3. Stop the wheel and check the bottom for thickness with your needle tool, it should be ⅜"-½" thick.

Step 4: Pull Up the Walls

Now comes the fun part — shaping your piece!

1. Wet Your Hands Again: Keep your hands moist to prevent the clay from sticking.
2. Pull the Walls:
   - Place your fingers on the inside and outside of the clay.
   - Apply gentle pressure and slowly pull upward from the base to create taller walls.
   - Keep the wheel spinning at a steady pace.
   - Make sure your walls are no thinner than ¼" and no thicker than 1 cm.
3. Refine the Shape: Use your sponge or rib tool to smooth the surface and shape the piece.

Step 5: Trim and Wire Off Your Piece

When you're happy with your creation, it's time to finish up.

1. Trim Excess Clay: Use your needle tool or wooden rib to remove extra clay from the bottom.
2. Cut the Piece Off: Use a wire cutter to separate your piece from the wheel.
3. Dry Your Piece: Let your piece dry to a leather hard state.
4. Trim a Foot: Once your piece has dried to a leather hard state, trim a foot on the bottom of your piece and sign it with your initials or signature. Then let it dry completely before firing it in the kiln to the proper cone for your clay.

Unit 8 - Wheel Throwing Bowl Project 1

Creative Options for Decorating Your Thrown Piece

There are many options for decorating the surface of your thrown piece. You may use any of the techniques or skills provided in the glazing units of this Ceramics manual (Units 3-6) or research and apply something else. You could also investigate a variety of skills with your instructor, 4-H leader, or club members. Identify some skills you would like to learn that will allow you to get very creative and original. Beginning with one of the skills, you can add combinations of carving, cut-outs, texturing, add-ons and unusual glazing and glaze combinations. You can indeed create some unique, one-of-a-kind pieces of art. If you formulated your own glaze, it would be good to include your recipe in your record book and write about this in your story. Evaluate your piece using the judging sheet as a guideline.

Unit 8 - Wheel Throwing Vase or Pitcher Project 2

Basic Information

For this project, you will be creating a vase or pitcher on the pottery wheel. You will be using basic techniques like centering the clay so it is perfectly balanced in the middle of the wheel so it doesn't wobble. You will be opening the clay, pulling up, shaping, and smoothing the clay into a vase or pitcher shape.

Steps

Step 1: Prepare the Clay

- Wire cut and weigh out about 1.5-2 lbs of clay from the pugged wet clay bag.
- Knead the clay like dough to remove air bubbles.
- Roll it into a ball.

Step 2: Attach the Clay to the Wheel

- While the wheel is off, slam the clay ball firmly onto the center of the wheel.
- Press it down so it sticks well.

Step 3: Center the Clay

- Turn the wheel on (medium-fast speed).
- Wet your hands.
- Use both hands to gently push the clay into the middle.
- The clay should spin smoothly without wobbling.

Tip: Elbows on your knees help keep your hands steady!

Step 4: Open the Clay

- Slow the wheel slightly.
- Press your thumb into the center of the clay.
- Stop about ½ inch from the bottom (don't poke through!) use your needle tool to check your thickness (when the wheel is stopped), your bottom should be ⅜"–½" thick.

Step 5: Pull Up the Walls

- Place one hand inside and one hand outside the clay.
- Gently pinch and lift upward.
- Repeat 2–3 times to make the walls taller and thinner.
- Make sure your walls are no thinner than ¼" and no thicker than 1 cm.

Tip: Go slow—thin walls are easier to break!

Step 6: Shape Your Vase or Pitcher

For a vase:

- Keep the bottom narrow and widen the top.

For a pitcher:

- Make a rounded body and slightly narrow the top.

Step 7: Smooth and Finish

- Use a sponge to smooth the inside and outside.
- Gently shape the rim with your fingers.
- Turn the wheel off.
- Add a spout once you are finished throwing but the clay is still wet and easy to manipulate.
- Handles are usually added later when the clay is firmer.

Unit 8 - Wheel Throwing Vase or Pitcher Project 2

Steps Continued

Step 8: Remove Your Piece

- Use a wire cutter to slide under the vase or pitcher.
- Carefully lift it off (or leave it to dry on the wheel bat).

What Happens Next?

- Let your piece dry slowly to somewhere between the soft leather and leather-hard state.
- Trim the bottom of your piece.
- Add a handle at this point, if you desire.
- Let the piece dry completely to the bone dry state then bisque fire the piece.
- Lastly, you can glaze it to your liking!

Unit 8 - Wheel Throwing Identical Pieces Project 3

Basic Information

For this project, you will be creating 2-4 cups, bowls, or plates so they look identical. The idea is to develop your skills in production pottery and make a set so the sizes and shapes are the same.

Steps

Use the same steps as Project 1 to prepare, center, and open your clay. Then make your cup, bowl, or plate shape. Once you create the first piece, you will need to repeat the same process with the next pieces, so they look as much the same as possible as the first piece you created.

You may need to create more than 2-4 pieces to come up with the 2-4 that look the most alike.

You can glaze the pieces differently if you like, but the size, shape, and structure of each piece should look identical.

Unit 8 - Wheel Throwing Exhibit Piece

Basic Information

This project will be your exhibit piece for project judging. Create a set of two matching functional pieces, such as two vases, cups, bowls, or plates of equal height, width and shape. Pieces should be trimmed, fully glazed, and complete. The pieces should be at least 4" in width or height and no larger than 12" in width or height.

Steps

You can use the best of the items you made in Project 3 as your exhibit pieces if you would like, or you can make something different. However, the pieces you select for your exhibit should be matching and identical.

- Complete your e-record and expense supplement sheets.
- Evaluate your project using the Unit 8 guideline for judging.

Challenge Yourself!

Once you've mastered the basics, try experimenting with new techniques:

- Add Texture: Use stamps, leaves, or tools to create patterns on your pieces.
- Mix Colors: Experiment with colored slips or glazes to make your pottery unique.
- Try New Shapes: Make vases, plates, or even teapots!

Learning how to throw ceramic pieces on a wheel is an exciting journey that combines creativity, patience, and skill. Remember to enjoy the process, celebrate your progress, and don't be afraid to make mistakes — they're part of learning! So, roll up your sleeves, get your hands dirty, and start creating your own pottery masterpieces. Who knows? You might discover a lifelong passion!

Guidelines for Judging Your Project

Here are some common issues to look out for when judging pottery:

- **Wobbly Shape:**
  This happens when the clay was not properly centered on the wheel.
- **Cracks:**
  Cracks can appear if the clay was not wedged properly or dried unevenly.
- **Uneven Walls:**
  Walls that are too thick or thin can cause structural problems and affect the look of the piece.
- **Glaze Problems:**
  Uneven glaze application, drips, or missing spots can make the piece look unpolished.
- **Sharp Edges:**
  Check that rims and edges are smooth and safe to touch.

Judging pottery pieces thrown on a wheel involves evaluating both the technical execution and artistic expression of the work. Whether you're assessing your own creations or someone else's, these guidelines will help you understand what makes a piece successful and identify areas for improvement.

Craftsmanship

Craftsmanship refers to the technical quality and skill demonstrated in creating the piece.

Key Points to Assess:

- **Centering:**
  Is the piece symmetrical? A well-thrown piece should be evenly balanced, with no wobbling or uneven walls.
- **Wall Thickness:**
  Are the walls of the piece consistent in thickness? Uneven walls can lead to cracking during firing or make the piece feel unbalanced.
- **Smoothness**:
  Check for smooth surfaces inside and outside the piece. Rough or bumpy areas may indicate poor technique.
- **Base:**
  Is the base of the piece even and not too thick or thin? A well-formed base supports the piece and prevents it from tipping over.

Design and Shape

The shape of the pottery should be visually appealing and functional.

Key Points to Assess:

- **Proportion:**
  Are the dimensions of the piece balanced? For example, a bowl should have a smooth curve and a stable base, while a mug should have a comfortable handle and rim.
- **Form:**
  Does the piece have a clean, intentional shape? Avoid awkward angles, unintended bulges, or slumping.

Guidelines for Judging Your Project

Design and Shape

- **Functionality:**
  If the piece is meant to be functional (e.g., a mug or bowl), does it serve its purpose? For example:
- Can the bowl hold liquid without leaking?
- Is the mug comfortable to hold and drink from?

Surface Decoration

Surface decoration adds artistic value and personality to a piece. It should enhance the overall design rather than distract from it.

Key Points to Assess:

- **Texture:**
  If the piece has a textured surface, is it intentional and well-executed? Uneven or accidental texture can detract from the design.
- **Glazing:**
  Is the glaze applied evenly? Does the color complement the shape and style of the piece? Are there any drips, bubbles, or areas where the glaze is too thick or thin?
- **Details:**
  If the piece has carving, stamping, or painting, are the details clean and well-defined?

Creativity and Artistic Expression

Evaluate the originality and aesthetic appeal of the piece.

Key Points to Assess:

- **Uniqueness:**
  Does the piece stand out or show a creative approach to design?
- **Theme or Story:**
  Does the piece convey a mood, idea, or story? Artistic pottery often has meaning or evokes emotions.
- **Color Harmony:**
  Are the colors and patterns used in the glaze or decoration visually pleasing and cohesive?

Functionality

If the pottery is meant to be used (e.g., as a bowl, mug, or vase), check how well it fulfills its intended purpose.

Key Points to Assess:

- **Size and Shape:**
  Is the size appropriate for its function? For example, a bowl should be deep enough to hold food or liquid.
- **Comfort:**
  If the piece has handles or a rim, are they comfortable to hold and use?
- **Durability**:
  Check for cracks or weaknesses that might make the piece fragile or prone to breaking.

Guidelines for Judging Your Project

Finishing Touches
The final details of a pottery piece can make a big difference in its overall quality.

Key Points to Assess:

- **Footing:**
  Is the base of the piece clean and finished? A well-trimmed foot adds a professional touch.
- **Signature/Mark:**
  Many potters include a maker's mark or signature on their work. This adds authenticity and personality.
- **Overall Finish:**
  Does the piece feel complete? Are there any rough edges, fingerprints, or smudges that detract from the finished look?

Overall Impression

Finally, consider the piece as a whole. Does it meet the expectations of a well-thrown pottery piece?

Questions to Ask:

- Is the piece visually appealing?
- Does it feel balanced when you hold it?
- Does it show skill and effort in its creation?
- Does the design and decoration enhance the piece, or does it distract from the overall look?

Production Molds

Image Source: https://i.etsystatic.com/26346607/r/il/589ace/5065804058/il_1080xN.5065804058_ebiv.jpg

Unit 9

Project Requirements

Create a set of three to five articles produced using either a purchased slipcasting plaster mold or a slipcasting mold you made yourself. The articles must use the same mold to show consistency in production, but articles can be finished using different techniques. In your record book story, share a business plan for selling items made using production molds.

Basic Information

Ceramic molds are a fun and easy way to create beautiful and unique pottery pieces. Unlike throwing on a wheel, using molds allows you to make consistent shapes and designs without needing advanced wheel throwing skills. This unit will teach you the basics of ceramic molds and guide you through the process of creating your first piece!

Ceramic molds are pre-made forms that you can use to shape clay into specific designs. They are like templates that help you create pottery pieces with a consistent size and shape. Molds are often made of plaster, which absorbs water from the clay and helps it harden.

These molds are hollow and designed to hold liquid clay (called slip). The slip hardens as the plaster absorbs the water, forming the shape of the mold.

The Importance of Your Slip

Slip isn't just clay put into a lot of water. Clay particles float in water and when you quit stirring, they fall to the bottom. The secret to making slip is to use a deflocculant, a chemical agent used to reduce the clay particles' attraction in liquid suspensions. It helps to disperse solid particles evenly in a liquid, preventing settling. Using them avoids excessive water addition and makes the slip smoother and more consistent.

There are different types of deflocculants such as bentonite, sodium silicate, and synthetic deflocculants like the products Optapix and Dolapix. Darvan 7 is one deflocculant preferred with porcelains and high iron content clay, while Darvan 811 can be used for stoneware, high fire slips and red low fire slips. Darvan 7 doesn't erode or wear away plaster molds like sodium silicate will.

Prepare a small quantity of slip and gradually add the deflocculant. Use a spatula or mixing tool to lift the slip up. It should form a continuous ribbon without breaking. Mix until the suspension is free from lumps. Take notes on the quantity used, so you can recreate the same viscosity in future batches.

Alternatively, rather than mixing your own, you can purchase slip that already has the correct properties for use in slip mold production.

Why Use Ceramic Molds?

Using molds is a great way to learn pottery because:

- **It's Beginner-Friendly:**
  You don't need advanced skills to create beautiful pieces.
- **Consistency:**
  Molds help you create pieces that are uniform in size and shape.
- **Creative Potential:**
  You can still add your own artistic touches, like carving, painting, or glazing, to make each piece unique.
- **Reclaimable:**
  Your clay is recyclable, so if you mess it up, you can reclaim the clay and start over.

Ceramic molds are an excellent tool for beginner potters to explore their creativity and learn the basics of pottery. By following the techniques in this chapter, you can create your own tiles, functional or decorative pieces with ease. Remember, pottery is all about experimenting and having fun, so don't be afraid to try new designs and ideas. If you are looking for more advanced skills, you can try making your own mold, but it is easier to purchase a mold of a figurine for Project 1 and a mold for a functional item for Project 2. Happy slip casting!

What You'll Need

Here's what you'll need to get started with molds:

- **Ceramic Slip Casting Mold:**
  Choose a mold based on the piece you want to create (e.g., a bowl, plate, or figurine). Plaster molds are the best option.
- **Slip:**
  For slip casting molds, you'll need liquid clay (slip), which can be poured into the mold.
- **Sponge:**
  To clean and smooth your piece.
- **Pottery Tools:**
  - Needle tool (for details and trimming)
  - Wooden rib or scraper (for smoothing)
- **Bucket of Water:**
  For cleaning your tools and hands.
- **Release Agent:**
  If your mold isn't made of plaster, you may need a release agent (like cooking spray or cornstarch) to prevent the clay from sticking.
- **Towel:**
  For cleanup.

Image Source: https://www.thecrucible.org/slip-casting-in-five-steps/

Using Slip Casting Molds

Slip casting molds are perfect for making hollow objects like vases, pitchers, or figurines. It is important to use molds made out of plaster as the plaster is porous and wicks (pulls) the moisture out of the slip using something called capillary action. The plaster mold acts like a paper towel pulling the moisture out. The longer the slip sits in the mold, the thicker the walls will get as it pulls the particles toward the edges of the mold. The open part of the mold where you pour the slip in is called the gate. The two sides of the mold sometimes have indentations and tabs that fit together, called keys, that line up the two sides and help hold the pieces together and keep them from shifting when they are joined. Lastly, each side of the mold is carved out to create the shape of the casting.

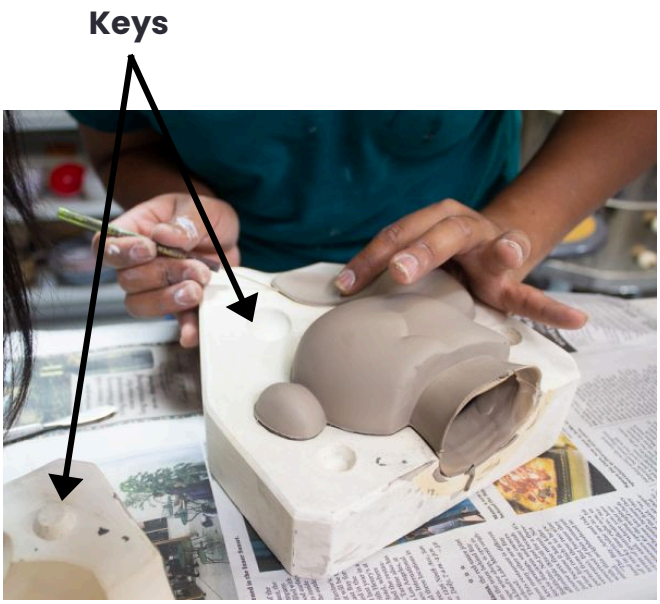


Image Source: https://www.thecrucible.org/slip-casting-in-five-steps/

Here's how to use slip casting molds:

Prepare the Mold:

- Make sure your plaster mold is clean and dry.
- Secure the mold halves together using rubber bands or clamps.

Pour the Slip:

- Stir your slip (liquid clay) to make it smooth. It might need to sit a little between stirring to make it more dense.
- Slowly pour the slip into the mold until it's full.

Wait for the Clay to Set:

- Let the slip sit in the mold for 30-45 minutes (depending on the size of the mold). The plaster will absorb water from the slip, forming a layer of solid clay against the mold's surface.

Pour Out Excess Slip:

- Carefully pour out any remaining liquid slip from the mold. This leaves a hollow form inside.

Dry the Piece:

- Leave the mold undisturbed for a few hours to let the clay harden enough for the shape to set up. Some of the moisture evaporates during this time.
- Once the clay is firm, gently separate the mold halves and remove the piece by a gentle jiggle motion so it releases from the mold.

Trim and Smooth:

- Use a needle tool to trim any rough edges or seams.
- Smooth the surface with a damp sponge.

Tips for Success

Here are some tips to help you make the most of your ceramic molds:

- **Start with Simple Shapes:**
  Choose molds with basic designs, like bowls or cups, before trying more complex shapes.

- **Keep Clay Moist:**
  Dry clay can crack or stick to the mold, so make sure your clay is soft and pliable.

- **Be Patient:**
  Don't rush the process! Let the clay set in the mold for the recommended time before removing it.

- **Clean Your Mold:**
  Wash your mold after every use to keep it in good condition and prevent clay buildup.

- **Experiment with Decoration:**
  Once your piece is out of the mold, you can add texture, carving, or painting to make it unique.

Common Challenges and Solutions

Here are some issues beginners might face and how to fix them:

Clay Sticking to the Mold:

- Use a release agent if your mold isn't plaster.
- Make sure your slip isn't too wet.

Air Bubbles:

- Mix your slip to the right consistency.
- Tap the mold gently to release trapped air when using slip.

Uneven Edges:

- Use a needle tool to trim excess clay and smooth the edges with a sponge.

Cracks:

- Avoid letting your clay dry too quickly. Cover it with plastic wrap if needed.Usually, it takes a while to figure out how long to dry at room temperature. Heating doesn't make it dry faster.

Warping:

- Slipcast shapes can warp more easily than wheel thrown objects during firing.
- This may be due to the slip casting recipe that has been used. For example, if your slip has soda feldspar, which has a lower melting point than other types of feldspar, that may cause some warping.

Unit 9 - Production Molds Figurine Project 1

Materials Needed

- Plaster mold (made or purchased two-piece figurine mold)
- Slip (watery clay)
- Sponge
- Toothpicks or wood/plastic detailing tools
- Water cup
- Newspaper or work board

Basic Information

In ceramics, a mold is usually made of plaster and shaped like an object—such as an animal, person, or decorative figure. Slip is poured into the mold to copy the shape. After removing it from the mold, artists can add details and make each figurine unique.

In this project, you will be making a figurine out of a two-piece figurine mold. Be sure to handle molds gently as they are fragile. Never poke tools deeply into the mold. Be sure to clean your hands before and after working with the clay. Also, move slowly when opening molds to avoid breaking the clay.

Steps

Step 1: Prepare the Clay

- Stir your slip (liquid clay) to make it smooth and the right consistency. It should be thick but still thin enough to pour.

Step 2: Prepare the Mold

- Make sure the mold is clean and dry.

Step 3: Join Mold Sections

- Carefully press the mold pieces together. If there are keys, be sure they fit together. Bind the pieces together firmly with rubber bands.

Step 4: Pour the Clay Into the Mold

- Pour the slip slowly so it goes into every part of the mold and to avoid air bubbles.
- If needed, jiggle the mold to get the slip into details (ears, arms, faces).

Step 5: Pour Our Excess Slip

- Wait 30-45 minutes and pour out the excess slip to leave the middle hollow.
- Let the mold sit another hour or two to dry until leather-hard (firm but still damp).

Step 6: Remove the Figurine from the Mold

- Gently open the mold.
- Carefully lift out the figurine using both hands.

Step 7: Clean and Smooth

- Use fingers or a damp sponge to smooth seam lines.
- Fill cracks or gaps with small pieces of clay.
- Blend carefully so seams disappear.

Unit 9 - Production Molds Figurine Project 1

Steps Continued

Step 8: Add Details

- Carve facial features, textures, or patterns.
- Attach extra clay for accessories (hats, tails, wings).
- Use slip to attach added pieces securely.

Step 9: Drying

- Let the figurine dry slowly under plastic.
- Turn occasionally to prevent warping.
- When fully dry, it is ready for firing.

What Happens Next?

- Bisque Firing – The kiln fires the clay, making it hard.
- Glazing – Color is added with glaze.
- Glaze Firing – The final firing makes it shiny and strong.

Image Source: https://www.thecrucible.org/slip-casting-in-five-steps/

Unit 9 - Slip Casting Molds Functional Item Project 2

Basic Information

For this project, you will try slip casting into a mold to create a functional piece, like a cup, plate, bowl, pitcher, vase, ornament, piggy bank, or other useful item. Items with a handle are more difficult to manage and may be an option if you are repeating this unit or for Senior 4-H members.

Steps

Use the steps you have learned from your practice projects to create your exhibit pieces. You can use glazing techniques learned from the other glazing units in this manual to finish your pieces.

- Complete your e-record and expense supplement sheets.
- Evaluate your project using the Unit 9 guideline for judging.

Unit 9 - Production Molds Exhibit Piece

Basic Information

This project will be your exhibit piece for project judging. Create a set of three to five articles produced using either a purchased slipcasting plaster mold or a slipcasting mold you made yourself. The articles must use the same mold to show consistency in production, but articles can be finished using different techniques.

Steps

Use the steps you have learned from your practice projects to create your exhibit pieces. You can use glazing techniques learned from the other glazing units in this manual to finish your pieces.

- Complete your e-record and expense supplement sheets.
- Evaluate your project using the Unit 9 guideline for judging.

Guidelines for Judging Your Project

Judging ceramic pieces made with molds is about balancing technical precision with creative expression. A well-made piece should be smooth, functional, and visually appealing while showcasing the artist's unique style. Use these guidelines to evaluate molded ceramics and improve your own skills. Remember, each piece is a chance to learn and grow!

Here are some common issues to watch for when judging molded ceramics:

- Visible Seams: Poorly cleaned or visible seam lines can make the piece look unfinished.
- Cracks or Chips: These can occur during drying, firing, or handling and affect the durability of the piece.
- Uneven Glaze: Drips, bubbles, or bare spots in the glaze can make the piece look unprofessional.
- Warping: If the piece is distorted or doesn't sit flat, it may indicate improper drying or firing.
- Overly Thick or Thin Walls: This can make the piece feel heavy or fragile.

Craftsmanship

Craftsmanship evaluates the technical quality and precision of the piece.

Key Points to Assess:

- **Clean Edges:**
  Are the edges smooth and well-finished? There should be no sharp edges or rough spots.
- **Seam Lines:**
  If the mold has seams (common in slip casting molds), are they cleaned and blended properly? Visible or rough seams can detract from the quality.
- **Surface Smoothness:**
  Is the surface free of cracks, air bubbles, or dents? The piece should look polished and intentional.
- **Uniform Thickness:**
  Are the walls and base of the piece consistent in thickness? Uneven thickness can lead to cracking or warping during firing.

Design and Shape

The shape and design of the piece should be aesthetically pleasing and appropriate for its intended purpose.

Key Points to Assess:

- **Proportion and Balance:**
  Is the piece well-proportioned? For example, a vase should have a stable base and a well-balanced neck.
- **Symmetry:**
  Is the piece symmetrical, or does it have intentional asymmetry that adds to its appeal?
- **Form:**
  Does the shape of the piece look clean, intentional, and well-executed?

Guidelines for Judging Your Project

Functionality

If the ceramic piece is functional, it should serve its purpose effectively.

Key Points to Assess:

- **Usability:**
  Can the piece be used as intended? For example:
  - A bowl should hold food or liquid without leaking.
  - A mug should be comfortable to hold and drink from.
  - A vase should stand upright and hold flowers securely.

- **Durability:**
  Is the piece strong and sturdy? Check for cracks or areas that might break easily.

- **Size and Weight:**
  Is the size appropriate for its function? Is the weight balanced and comfortable to handle?

Surface Decoration

Surface decoration adds personality and artistic value to the piece. It should complement the overall design.

Key Points to Assess:

- **Texture:**
  If the piece has texture, is it intentional and well-executed? Uneven or accidental texture can look messy.

- **Glaze Application:**
  Is the glaze applied evenly and smoothly? Are there any drips, runs, or bare spots? Does the glaze enhance the piece's design and complement its color and form?

- **Detailing:**
  If the piece includes intricate designs, carvings, or stamps, are they clean and precise?

Creativity and Originality

Creativity is all about how unique and imaginative the piece is.

Key Points to Assess:

- **Innovation:**
  Does the piece show a creative use of the mold? For example, has the artist combined different molds or added unique elements?

- **Personal Style:**
  Can you see the artist's personality or vision in the piece? This could include unexpected colors, patterns, or textures.

- **Artistic Expression:**
  Does the piece tell a story or evoke emotions? Is there a theme or concept behind the design?

Guidelines for Judging Your Project

Finishing and Presentation

The final touches can make a big difference in how polished and professional a piece looks.

Key Points to Assess:

- **Footing:**
  Is the base of the piece clean, smooth, and finished? A well-trimmed foot shows attention to detail.

- **Consistency:**
  Is the piece free of fingerprints, smudges, or other accidental marks?

- **Overall Finish:**
  Does the piece look complete and ready for display or use?

Overall Aesthetic Appeal

Finally, consider the piece as a whole. How does it make you feel? Does it look attractive and well-made?

Questions to Ask:

- Does the piece catch your eye?
- Does the design and decoration enhance the overall look, or does it feel overwhelming or underwhelming?
- Does the piece look intentional and thoughtfully crafted?

Glossary of Ceramic Terms

Adaptation: The process of changing the original design of the greenware.
Airbrush: Small spray gun used for applying glaze, underglaze or stains. Also used for shading and general decorating.
Air Bubble/Pocket: Air trapped in the body or walls of the clay.
Antiquing: Removing applied color to accent detail.
Banding Wheel: A hand-operated turntable used to apply or blend bands of color and to accomplish other types of decorating.
Beveling: The process of cutting or shaping the edge of a clay piece at an angle, rather than a 90-degree perpendicular, to create a sloped, smoothed, or refined edge.
Bisque: Clay that has been fired to maturity but not glazed.
Blistering: Broken bubbles on fired glaze surface.
Blocking: A painting technique using thin, diluted paint or glazes to cover a blank surface quickly. Large brushes help maintain a loose, expressive, and non-detailed approach to help map out where darks and lights go, which helps create depth and structure before adding finer details.
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 design.
Butting: Term used to describe placement of two or more glazes in close proximity on the same piece. The glaze is applied so that it comes within the width of a pencil-point line of the first glaze but does not touch, the butting technique prevents glazes from flowing together.
Cat's Tongue: Flat brush with pointed tip.
Casting: The process of filling a plaster mold with casting slip, thus creating a clay object.
Casting Slip: A liquid clay for mold casting.
Ceramics: Any type of clay objects given permanent shape by firing in a kiln.
China: Glazed porcelain with a shiny surface.
China Paint: Paint fired onto glaze and bisque.
Clay Body: Earthenware, Stoneware and Porcelain are the three most popular. Available in both slip and modeling clay.
Cleaning Greenware: Removal of mold seams, 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 thickly.

Glossary of Ceramic Terms

Coil Technique: A rope of clay used for hand-building clay pots.
Concave: Hollow (ex. bowl)
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.
Convex: Dome shape, as a bubble.
Crackle Glaze: Glazes which have been especially formulated to produce a delicate "crazed" surface pattern.
Craters: Bubbles that form, break and then set as the kiln cools.
Crawling: A term used to identify a glaze defect in which the glaze pulls away or crawls from the bisque. Caused by glaze being applied over a hard spot, dusty or soiled bisque.
Crazing: Hair-like cracks which appear on a fired glaze surface. Often referred to as either immediate or delayed crazing.
Cross-Hatch: Crisscross scratches made where two pieces of clay are to be joined.
Crystals: A specially formulated colored glaze that have been fired and then ground to various sizes.
Crystal Glaze: Glazes combined with crystals which melt in the firing to form interesting patterns.
Decal: A design on special paper, transferred to a glazed surface and fired for permanency.
Dry-Brushing: Feather-effect brushstroke achieved by using a dry brush with wet color; used also for animal fur.
Dry-footing: Bottom area of article left unglazed so stilting is unnecessary. A technique used with Stoneware and Porcelain.
Dust-free Technique: A method for cleaning without creating dust. Ware and tools are kept wet throughout cleaning.
Earthenware: Non-vitreous (porous) low-fire clay body.
Earth-tones: Buff, red, brown.
Embossing: Is the act of forming a raised design.
Ferrule: The metal that holds the bristles of the brush and the handle together.
Figurines: A small, three-dimensional sculpture or statuette representing a human, deity, or animal; often used for decoration, collecting, or for display; also sometimes called models or figures.
Firing: The process of maturing ceramic products by various degrees of heat.
Flux: A white powder that can be added to china paint to help it bond to the porcelain or to add gloss to the paint. Also helps china paint move more freely.

Glossary of Ceramic Terms

Functional Art/Pottery: The intersection of aesthetics and utility, where everyday, practical objects—such as furniture, lighting, ceramics, and textiles—are designed with high artistic intention, blurring the line between fine art and daily life, allowing functional items to serve as creative, expressive, and decorative pieces.
Greenware: A form of raw clay. May vary in color depending on clay body.
Glaze: A raw material that must be fired to bring out the finish.
Gate: The opening in a plaster slip cast mold that you pour the slip in and out of.
Hand building/Hand built: An ancient manual ceramic technique of creating functional or decorative forms—such as vases, bowls, and sculptures—using only hands and simple tools, rather than a pottery wheel; involving techniques like pinching, coiling, and slab building to create unique, and often organic shapes.
Hard Spot: A spot on greenware that resists decorating material. May be caused by chemical build up on mold used or cleaning greenware with oil on the hands.
Incise: The design is scratched in the greenware before color has been applied.
Kiln: A thermally insulated chamber, essentially a high-temperature oven or furnace, used to harden, burn, or dry materials like clay (pottery), bricks, glass, and cement. It creates permanent physical or chemical changes, such as firing ceramics, roasting metal ores, or drying lumber.
Knead: To condition modeling clay.
Leather-hard: A term used to describe cast or hand formed clay items that are damp but firm enough to handle without losing shape.
Loading: A process of completely filling a brush with color.
Luster: Decorating medium applied over fired glaze for iridescent effect.
Majolica: A glaze or underglaze decoration over any unfired glaze that does not move in the firing.
Matte Glaze: A non-moving glaze which produces a smooth, dull matte finish after firing.
Mending: Repairing broken greenware or bisque.
Modeling Clay: Clay used for hand building or throwing on a wheel.
Mold: A hollow plaster of Paris form in which articles are reproduced through the use of liquid clay.
Mold Keys: Concave and convex interlocking features, often called "registration keys" or "alignment keys," carved into the parting faces of plaster mold segments. They ensure precise alignment and secure locking of the mold halves, preventing shifting during assembly and pouring.
Non-Functional: Ceramic art created primarily for aesthetic, conceptual, or display purposes rather than practical daily use (e.g., as dishes or storage). These pieces focus on artistic expression, often highlighting sculptural forms and unique glazes or textures.

Glossary of Ceramic Terms

One-stroke: A highly concentrated, translucent underglaze paint used for detailed work.
Opaque: A color you are unable to see through.
Overall Wash: Flesh-tone tinting of bisque doll surface. Usually the first China paint firing.
Overglaze: A decorative finish, fired over a glazed surface.
Overfiring/Overfired: Occurs when ceramic material is fired beyond its maturation point, resulting in excessive vitrification, warping, bloating (bubbles/blisters), and severe shrinkage. It often becomes brittle, discolored, or melts, potentially fusing to kiln shelves. Common causes include exceeding temperature limits or improper kiln firing schedules.
Palette Knife: A flexible steel-blade knife for mixing color.
Pinch Pots: Pots made by pinching out the wall of a lump of clay.
Pin-holes: A glaze defect caused by under-fired bisque, dust left on ware or in the kiln, applying glaze to greenware and/or poor condition of greenware.
Plasticity: The characteristic of being workable into many shapes.
Polish: A southeast Indian technique. They polished their pots with stones that were handed down from generation to generation. A soft cloth, tissue or a large burnishing agate may be used to polish underglaze on greenware.
Pooling or Puddle: Fired glaze which has run to the bottom, causing drips or into the detail, causing an over-glazed condition.
Porcelain: The grandest of all the clay bodies. A translucent, vitreous clay body when high fired. Very delicate in the greenware for. Available in many colors.
Pour Gate: The portion of the greenware that was formed when the slip was poured from the mold.
Potters 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.
Quill: A type of brush used for China painting.
Raku: A 16th-century Japanese pottery technique and style—meaning "enjoyment" or "pleasure"—characterized by hand-modeling, low-temperature firing, and rapid cooling. It often involves removing glowing-hot, glazed pieces from a kiln and placing them in combustible materials (like sawdust) to create unique, smoke-darkened, and crazed finishes.
Release Agent: A specialized substance—often wax, silicone, or soap—applied to plaster or synthetic molds to create a thin barrier that prevents ceramic slurry from sticking, enabling clean, undamaged removal of the cast piece. It reduces surface tension,

protects mold detail, and increases production efficiency.
Rolling Glaze: A method of covering inside area of ware, by rolling thinned glaze inside, then pouring out the excess.
Roughing: Applying translucent stains with a cloth, over an opaque base coat.
Score: To scratch tiny crisscross lines on the areas of greenware that will be attached together with clay slip.
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Scrubbing: Application of the initial priming coat of thinned opaque underglaze or glaze. Also, an application of stain with a stiff bristle brush.
Scum: A haze that forms on fired gold and luster from insufficient ventilation in the kiln.
Seasoning: To let the kneaded/wedged clay rest for a day or more to create a dense clay body with a uniform character.
Sealer: A clear fixative to protect unfired finish available in both brush-on and spray.
Seam Line: Outline on casting showing where the mold halves meet.
Sgraffito: A method of creating a design by gently scratching through applied color to the color of the clay body beneath it.
Shivering: Occurs when glaze and clay body are incompatible. Usually the clay body shrinks more than the glaze, causing the glaze to peel.
Silk Sponge: For decorating, recognizable by short hairs over entire sponge.
Slab: A rolled out section of clay.
Slip: A liquid suspension of fine clay particles in water, acting as a versatile material for casting, decoration. A casting medium for plaster molds and a surface decoration technique.
Slip Trailing: Using slip in an applicator to flow on design.
Sling: Burlap used to cradle clay to make a slab bowl.
Slurry: Clay-body, thinned with water, used for joining moist clay sections.
Soft-Firing: Partial porcelain bisque firing (to cone 018 or 019 in kiln sitter) for preparing ware for dust-free cleaning.
Solvent: A dissolving agent used in antiquing and to clean brushes of petroleum base paints.
Spatter: Method of applying small flecks of color to ware.
Spill Glaze: A special effect glaze used over or under glazes, causing them to flow and blend.
Sponge Veiling: The use of a sponge instead of brush to apply colors over a base coat.
Stagger: To separate successive coats of glaze by fractions of an inch to prevent glazes from flowing together or from dripping from base of ware in firing.

Glossary of Ceramic Terms

Stain: Decorative, unfired, finish applied to bisque or to accent pattern.
Stencil: A cut out pattern used to apply a design by brushing, sponging or spraying.
Stick-on: Greenware parts attached to the main cast piece, with slip.
Stilt: Support used to hold glazed article above shelf during firing.
Stipple Brush: Round brush with straight or angled end that apply color with a series of tiny dots.
Stippling: A method of applying color by pouncing the tip of a brush loaded with color against the ware.
Stoneware: A heavily grog clay body requiring a high firing to vitrify. Available in many colors.
Stylus: A pointed instrument for writing or drawing. Best tool for incising.
Template: A pattern or guide used in shaping a clay form.
Terra-Cotta: Natural low and high-fired clay. Also a color.
Texture: Planned surface finish or roughness produced for interest.
Thermocouple: A high-temperature sensor used in kilns to monitor, control, and measure furnace temperatures during firing.
Tint: To lightly apply diluted colors over a base coat or coloring a product with another product.
Tipping: Touching tip of loaded brush with other colors for muted shading or accenting.
Translucent: Allows color underneath to show through.
Underfire/Underfired: Occurs when clay or glaze does not reach the required temperature or time to fully mature, resulting in a fragile, porous, or rough-surfaced piece. It is characterized by dull colors, muted glazes, crazing, and poor durability. Common synonyms include immature, under-matured, or “raw” pottery.
Underglaze: A ceramic color designed to be used under a glaze. Usually applied on greenware.
Utility Items: Dinnerware, cups, canister sets- functional rather then purely decorative items.
Veiling: Involves applying thin, often diluted, layers of glaze over a previously applied base glaze or directly onto the bisqueware. This method allows the underlying colors or texture of the pottery to remain partially visible, creating a luminous, subtle, or layered "stained-glass" effect, rather than a solid, opaque coverage.
Vent Holes: Small holes made by piecing greenware attachments to allow trapped gases and moisture to escape from attachments during bisque firing.
Viscosity: Resistance to flow.
Vitreous: Impervious surface (waterproof).
Vitrify: To become stone-hard, impervious surface.

Glossary of Ceramic Terms

Wash: Paint and water solution, used for shading and antiquing.
Wedge: To condition and work clay into a bubble free mass for throwing and hand building.
Wedging Board: A plaster block used for conditioning modeling clay.
Wet Cleaning: Another name for the dust-free cleaning technique.
Wood Glaze: Satin glazes with tiny dark specks which form a woo-grain effect when brushed on.
Wool Sponge: A sponge with a very open texture that is soft when wet.

Resources

Ceramics Lesson Plans for Teachers and Leaders: https://skutt.com/kidsneedclay/learn-create/ceramics-lesson-plans/

Ceramics Arts Network

- CLAYflicks (A subscription video service with how-to instructional videos, interviews, studio visits, and exhibition tours. The cost is $10.95 per month or $112.00 per year.): https://ceramicartsnetwork.org/clayflicks
- Books for sale on a variety of topics: https://ceramicartsnetwork.org/shop/shop-by-product/books
- Teaching Clay in the Classroom teacher guides for sale on various techniques: https://ceramicartsnetwork.org/shop/shop-by-topic/for-teachers
- Freebie Guides (must create an account to access): https://ceramicartsnetwork.org/freebies
- How to Make Pottery (free download https://ceramicartsnetwork.org/docs/default-source/uploadedfiles/wp-content/uploads/2014/03/fg16-howtomakepots.pdf

Find Pottery Places:
https://mypotteryplace.com/pro-studio-locater/

Sarah Mundy Resources:
This is a separate curriculum not related to the 4-H Ceramics manual, but it may provide some useful ideas for planning a unit.
https://drive.google.com/file/d/1HOTW4cXP7JKxrGJ9BlQJrNte7xGrta8k/view?usp=drive_link

References:
Rhodes, Daniel, (1957b), Clay and Glazes for the Potter, (Third Edition), Krause Publications

Some information in this manual was obtained from the online Knowledge Center of Soul Ceramics, Marco Island, Florida, (https://www.soulceramics.com/) from the following pages:

- A Mini Guide to Bisque Firing [Tips & Tricks!]
- Loading Your Kiln
- Pottery Wheel Throwing Tips & Techniques
- What is a Cone? A Guide to Pyrometric Cones and Kilns