Name _____

Weber State University

CERAMICS II
ART 3310
Class meeting day/time _____

Instructor: Stephen Wolochowicz
Office: The Ethel Wattis Kimball Visual Arts Center: Rm 131
(inside ceramics studio)
Phone: 801.626.7066
E-mail: Swolochowicz@Weber.edu
Office Hours: Thursdays 11:30am-12pm
& by appointment

Description of course:

The second class in a two-part introductory ceramics series. This course expands upon hand-building and covers wheel-thrown techniques in greater depth. Additional approaches to clay surfacing are explored. Students learn clay mixing, glaze testing and principles of kiln firing. Prerequisite: ART 2310

For this class students should know:

- The basic properties of clay and clay bodies
- The potential and limitations of the material and process
- How to respond to the material according to their individual modes of expression
- Various techniques of applying color and glaze surface to clay and ceramic
- A working ceramic vocabulary
- How to conduct research
- How to communicate their concepts and content through class critiques

In this class, students will:

- Learn to mix large amounts of stoneware and earthenware clay
- Demonstrate more advanced technical skills and craftsmanship
- Demonstrate technical skills in basic wheel thrown methods – plates, bowls, mugs
- Demonstrate technical skills in hand building processes – slab, coil, etc.
- Learn to create and use ceramic decals
- Learn shellac resist techniques
- Resolve individual problems relating to form and content
- Understand the principles of firing – gas and electric kilns
- Load and unload kilns
- Learn to bisque fire
- Demonstrate slip decorating and glazing techniques
- Learn low fire surfacing techniques (majolica, terra sigillata, textured surfaces, etc.)
- Learn principles and concepts of clay and glaze formulation
- Research and test decorative slips, clay bodies, and glazes
- Learn to properly mix decorative slips and glazes
- Develop a comprehensive ceramic vocabulary
- Conduct research expanding their breadth of historical and contemporary knowledge

Students will be evaluated on:

60% • Individual projects (completed/finished)
Craftsmanship, creativity, expression, concepts, thoughtfulness, etc.
• Ceramic vocabulary
• Thoughtful participation in class and critiques
• General interest and thoughtful effort
• Sketchbook – research, notes, handouts, ideas, etc.

40% • Test on materials, process, vocabulary
• Completion of low-fire research assignment
• Participation in clay making, kiln firings, high fire glaze making
• Completion of high-fire glaze making

Supplemental considerations to overall grade:

• Homework assignments (grade reductions)
• Attendance (grade reductions)

Please note that ceramics is a long process. Some projects can take all semester to complete. Therefore, grades are not distributed or calculated on a regular basis- it is not an accurate measure. Just remember that missing homework, deadlines and project requirements for critiques will affect your overall grade. I will offer "soft" grades during the semester as a progress report. Your final grade is calculated at the end of the semester taking in account for all items listed above. I am always happy to discuss your personal progress at any point during the semester.

Grading:

The following grades and numeric point values are used to compute the cumulative grade point average by WSU.

A	4.0	93-100%	• Exceptional work and high level of understanding of process/concepts
A-	3.7	90-92.9%	• Work and effort went above and beyond minimum expectations
B+	3.3	86-89.9%	
B	3.0	83-85.9%	• Good work. Above average understanding of process and concept
B-	2.7	80-82.9%	
C+	2.3	76-79.9%	• Average/ Acceptable work. Little deviation from project concept.
C	2.0	73-75.9%	• Minimum requirements accomplished
C-	1.7	70-72.9%	
D+	1.3	66-69.9%	
D	1.0	63-65.9%	• Below average work. Lack of effort in project concept and process
D-	0.7	60-62.9%	
E	0.0	below 60%	• Unacceptable

Supplemental Considerations To Overall Grade:

Unprofessional Behavior: Being a student is a job. Please respect your fellow students, faculty, staff, and visitors to campus. Unruly behavior is not tolerated in the Ceramics Studio and you will be asked to leave, resulting in an absence for the day.

Stewardship and Studio Practice: You are responsible for your mess. Please clean up your area accordingly. Remember, there are over 60 students using this space. We all need to do our part to keep the studio clean and safe. You will notice the absence of brooms. Sweeping causes clay dust - which contains silica. The best way to clean up is by pulling a scraper to collect large debris and by wet processes: sponge or mopping.

Out of class work time: Your EFFORT and time spent will not go unnoticed. Do the best job you can on your projects. Studio art classes require 3-6 hours a week of out of class work time. If you utilize your time efficiently, you should be able to complete most of your projects during class time.

Homework Assignments: Homework assignments are designed to maximize your hands on work time in the studio. Your research and preparedness for class is the best way to efficiently utilize your class time. Most homework I assign is gathering and collecting your ideas for you projects. Incomplete homework on its respective due date will result in a 1 point reduction to your overall grade. This deduction cannot be reversed.

Participation in clay making, kiln firing, glaze making: As an upper level student you are a representative of the studio and the beginning class will look up to you. Also, learning these are fundamentals in ceramics are key to our course objectives. You are part of the studio team and are required to help maintain the facility and proactively engage in these processes. Non-participation will result in a full letter grade reduction to your overall grade.

Materials and fees:

There is a lab fee for this course. Lab fees pay for the maintenance of equipment and for clay and glaze materials. Lab fees are kept as low as possible. Many of the materials we use are extremely expensive. All clay used in class MUST be made at Weber State University. All students are required to help make clay during the semester. I will demonstrate, coach and supervise all aspects of this activity. This is an in-class activity. Please use as much clay as you need but remember it is a chore to make more.

Attendance:

This course begins on the first scheduled day of the semester and has homework and assignments on that day. Students who enroll later in the semester are not excused from the attendance policy or homework policy due to late enrollment time. Class starts promptly at _____. **Attendance is mandatory**. It is important that you attend every class. The information through lecture and demonstration as well as receiving my help is invaluable to the process. This is ultimately reflected in your grade. Students are expected to be here and working during class time. You are late if you missed the morning announcements. After 20 minutes you are marked as absent. Not working on relevant class projects or leaving early is also a "late". 2 lates equal an absence. Attendance will be taken via a sign-in sheet at the beginning of class. It is your responsibility to remember to sign-in. I also keep attendance and tardiness in my records. Attendance is a vital part of your grade. Your 3rd absence will lower your final grade by 5%. Each absent after that will result in an additional 5% deduction to your final grade. The Department of Visual Arts has a general policy of 6 absences resulting in a failing grade (E) for the course. Please use your "freebies" wisely.

Doctor's notes do not excuse absences, however, they can help in the long run. (i.e.- prolonged illness or frequent illness vs. student health center note for a headache to miss a critique) Along these lines, being a student is a full time job. We all have unique lives that encompass many responsibilities. These may include: pets, children, family, other jobs, extracurricular activities, mid semester vacations (Really?), etc. Please remember these do not excuse you from class. Though rare, I am willing to work with students who demonstrate extraordinary circumstances.

Critiques cannot be made up, treat them like an exam. DO NOT MISS A CRITIQUE. I will work with students who have contacted me prior to a critique who have a university recognized reason for not being present.

Like all studio art classes, it will also be necessary to spend some time outside of class working on your projects and/or monitoring the drying of you projects. Ceramics is not like riding a bike, it's like learning an instrument. It takes time and practice. A little each day is time well spent.

There is a mandatory studio clean up day at the end of the semester. This is typically the last day of regular scheduled class (not exam week). Absence will result in one full letter (10%) grade reduction to your overall grade.

Students who have not removed their work from the ceramics studio and returned their locker in clean condition by Friday, 5pm Finals Week, will receive a 5% reduction in their final grade.

Please turn off all ringers, alarms, etc. on you devices. They are a distraction to the process of learning. In class use of cellular phones, e-mail, radios, i-pods, headphones, social networking online, etc. is prohibited during scheduled class time. Feel free to use any or all outside of scheduled class time. I consider these distractions and as non participatory and it will result as an absence for the day.

Student Athletes: You are required and it is your responsibility to provide me with a list of the classes that you will not be attending for the semester prior to your first away event. The athletics department has guidelines to what constitutes a travel/away day.

Projects:

For these classes, students will be focusing on hand-building projects and/or pottery wheel based initiatives with varying surfacing solutions and temperature ranges. Because we have four classes meeting at the same time, the direction of our projects will largely be dictated by the overall class and individual student interests. Each project will have a specific problem to solve, technical and/or content based. An emphasis will be placed on the process, issues in timing, surfacing solutions, and principles of structure and form. The degree of challenge, idea, motives, and technical issues involved in the completed works will be discussed and evaluated during critiques.

Critiques:

Assignments are due on specific critique days, and are to be finished and ready to be discussed. If they are not done on time, your project grade will be penalized. It is better to show incomplete work then to not show up to class at all. As far as grading is concerned, incomplete but sincere work is valued. Conversely, last minute and non-thoughtful projects will not receive any credit. **An absence from a critique will lower your final grade by 10%. DO NOT MISS A CRITIQUE.**

Class Critiques will be scheduled in accordance with each assignment. We will have a minimum of two (2) class critiques as well as multiple informal brief in-process critiques. They are intended for discussing discoveries, problems, intent, and content. Critiques are environments for students to voice their thoughts and concerns in regards to their work as well as that of their classmates. Critiques are a vital part of the art process. Attendance and relevant verbal participation are mandatory. Participation will be evaluated and recorded, as it is a part of your overall grade. Because we typically have a smaller class, I encourage you to ask your classmates for their input and thoughts in regards to your works in progress or overall concepts.

Semester Calendar:

I have provided you with a tentative semester schedule that outlines key dates: critiques, last wet work, last bisque, the first 4 homework due dates, research project dates, etc. Because we are four classes in one meeting time, the content of demonstrations will be determined by student interest and therefore are not listed. However, glazing, decoration techniques, surfacing, the pottery wheel, and hand building techniques will be addressed. The typical class breakdown will be: the first hour of class (most days) will be reserved for demonstrations, lectures and presentations with the second half (most days) designated as work periods. Homework assignments are discussed assessed at the beginning of class. We will have at least 2 critiques and a final critique of all work (finished and complete) during exam week. I communicate primarily to the class via your Weber e-mail address and on the white board in class. However, be mindful that whiteboard notes can get erased. I communicate any schedule changes and additional information needed for our class through these channels. It is your responsibility to check your e-mail and all students are required to have an active WSU e-mail account. Since we are many classes in one, you will be on a group e-mail with the ability to "respond to all". *Hint: you can forward your WSU e-mail to other accounts and devices. For more info call IT Services at 626-7777 or visit the IT Service Desk through the WSU website.*

Communication:

I communicate to the class in three ways:

- During class
- On the whiteboard in the classroom
- Via E-mail

You can communicate to me in four ways:

- In class
- Office voicemail (not preferred)
- E-mail
- Schedule a meeting

Sketchbook:

Students are required to have a 3-ring binder. ALL notes, handouts, assignments, sketches, and ideas are to be organized into this binder. Each project requires appropriate research. Some students enjoy limiting the role of the hand with computer based modeling and appropriated imagery. These need to be printed out and represented in your sketchbook. I provide access to a 3-hole punch for adding pages to your research binder. This book is required at every class. I will collect and grade this at the end of the semester.

In addition, all students are required to have appropriate writing implements and paper for taking notes and sketching.

Studio Access:

The ceramics studio is open to enrolled students only. Children, spouses, partners, pets, etc. are not enrolled students and should not be in class with you. During the semester I keep the main doors unlocked 24/7. However, the Kimball Arts Building has limited "open" access. Ceramics classes are held _____. You can work in the other room during these other classes **except** during critiques. You become a distraction to the class in critique.

Kimball Arts Building hours:

M-F	7am-11:59pm
Sat.	8am-6pm
Sun.	Closed

Homework:

You will have in class and out of class homework assignments throughout the semester. Each incomplete homework will deduct 1 point off of your final grade. Below are some expected homework assignments for this course. You will either get full credit or no credit on HW.

Because we have four classes meeting at the same time, homework and assignments are assessed and administered according to the individual student's direction, focus, and interest. All students will have the same due dates though the breadth of the assignment may vary according to the class or individual.

By the 3rd class, ALL students will have completed the following:

HW#1 3-ring binder
HW#2 Proper tools for the class- must have the tool kit items, brushes, sur-form
HW#3 Free subscription to CeramicArtsDaily.org
HW#4 Research completed on Project#1 (TBA first class)

Most Fridays, CeramicArtsDaily.org has a "Video of the week". At minimum there is a "week in review" that you should find time to explore. You are responsible for watching every edition. Expect a pop quiz during the following class from the previous weeks video. This counts as a homework assignment and you will receive full or no credit (minus 1 point final grade). If you are absent, you will only have the next scheduled class period allotted as a make up. It is the student's responsibility to ask for the makeup.

Also, when you are absent, all other homework assigned must be presented at the beginning of the next class you attend to retain full credit for that assignment.

Tools:

- Plastic bags
- Eye protection
- Rubber gloves
- Silica-rated dust mask
- Spray bottle
- Plastic Bucket
- Sm kitchen knife
- Fork
- Sure-form rasp
- Variety of soft brushes (bamboo)
- Change of clothes
- Sketchbook (3-ring binder)
- Pad lock for locker
- Towel
- Lockers: Each student will be given a locker in the studio for the semester. Locks are the responsibility of the student. Your lockers must be cleaned out and wiped down at the end of the semester during our studio clean up day.

Pottery tool kit items:

- Sm sponge
- Needle tool
- Cut off wire tool
- Wood knife
- Wood rib tool
- Metal rib tool
- Sm loop tool
- Lg loop tool
- Rubber rib (optional)

Resources:

I do not have a mandatory textbook for this course.
Your complete sketchbook with all handouts and e-mailed PDF files will serve as your textbook.

Suggested books:	*The Craft and the Art of Clay*, by Susan Peterson *The Ceramic Handbook*, by Val Cushing *Clay and glaze for the potter*, by Daniel Rhodes *Potters dictionary of materials and techniques*, by Frank & Janet Hamer
Internet sources:	NCECA.net Digitalfire.com Ceramicsmonthly.org Ceramicsculpture.com Potterymaking.org Pottery.org ArtAxis.org AccessCeramics.org Glazy.org
Magazines:	Ceramics Monthly Ceramics: Art and Perception Ceramics: Technical American Craft Clay Times Pottery Making Illustrated
Online Galleries:	Claylink.com a.k.a. Charlie Cummings Gallery SchallerGallery.com SherrieGallery.com SherryLeedy.com RedStarStudios.com GarthClark.com FrankLlyod.com
Online AWESOMENESS!!	CeramicArtsDaily.org (students are required to open a free account)

Additional notes:

BFA Program
•If you are considering becoming an Art Major, schedule a meeting with a faculty member in your area of interest. They will help guide you through the application process and relay the expectations for the specific area of study

Scholarships
•The University, College and individual departments have scholarships. Some are general, honors based , major or minor specific, etc… There are many to be awarded. A little research can end up paying you!

Artwork Documentation
•All student work is subject to photographic documentation for my records, assessment needs, as future class examples, etc. Students may contact me for a copy of their artwork images. I will also, with prior scheduling and approval, teach students to document their own work and "fix" the images in Photoshop. I will have a DVD that you can upload your artwork from. Additionally, you are now required by the College of A&H to fill out a "Photo Release Form". It is an online form located on the A&H College homepage under "Newsroom". You have to right to not consent. E-mail notification is required the first week of classes confirming you have completed the form or wish to opt out.

Academic integrity

•As specified in PPM 6-22 IV D cheating and plagiarism violate the Student Code. Plagiarism is "the uncited use of any other person's or group's ideas or work" Students found guilty of cheating or plagiarism are subject to failure of a specific assignment, or in more serious cases, failure of the entire course. The WSU Student Code includes a more extensive list of prohibited behaviors; you should familiarize yourself with all aspects of the code. Students who commit infractions of the WSU Student Code will be dealt with according to procedures outlined in the code.

Core Beliefs

•Weber State University recognizes that there are times when course content may differ from a student's core beliefs. Faculty, however, have a responsibility to teach content that is related to the discipline and that has a reasonable relationship to pedagogical goals. If you, as a student, believe that the content of the course conflicts with your ability to pursue a topic, you may request a resolution from the instructor. The instructor is not obliged to grant your request except in cases where a denial would be arbitrary and capricious. Your request must be made in writing and copies must be delivered to the instructor and the department chair. The request must clearly articulate how the assignment would place a burden on your beliefs. Please see WSU policy 6-22 for further clarification on this policy.

Disability Accommodation

•PPM 3-34 notes: "When students seek accommodation in a regularly scheduled course, they have the responsibility to make such a request at the Center for Students with Disabilities before the beginning of the [semester] in which the accommodation is being requested. CSD can also arrange to provide course materials (including this syllabus) in alternative formats if necessary.

Code Purple Emergency Notification

•System Code Purple is an emergency notification system that gives Weber State University the ability to communicate health and safety emergency information quickly--by text, voice, and e-mail message. By enrolling in Code Purple, you may receive safety-related information, regardless of your location. WSU has contracted with the third-party firm Send Word Now to provide the infrastructure and equipment to support the Code Purple notification system. To review or update your contact information, please log in to the eWeber portal and click on the link under the WSU Code Purple channel on the main eWeber page. If you do not wish to be notified by the Code Purple system in the event of an emergency, click the "deactivate my account" button at the bottom of the Code Purple registration page.

Emergency Closure

•If for any reason the university is forced to close for an extended period of time, we will not have class. We will continue where we left off on our schedule when classes resume. If we have/had a critique we will have it the next class period. Look for an e-mail from me outlining the schedule changes.

Stay Informed

•The Telitha E. Lindquist College of Arts & Humanities (www.weber.edu/cah) wants to ensure you stay updated on all of the events, announcements and opportunities in our college. In addition, you will have the opportunity to win prizes on Facebook and Twitter that you will not want to miss. As such, we encourage students to follow our college on the various social media platforms listed below.

 Facebook.com/WSUartsandhumanities.com  @WeberStateArts  Lindquist College of Arts and Humanities

Weber State University ART 3310, ART 3320, ART 4310, ART 4320 **M / W 2pm – 4:45pm**

Stephen Wolochowicz Swolochowicz@Weber.edu 801.626.7066	Monday	Wednesday
Week 1 8/29 & 8/31	Studio tour, syllabus, All semester handouts as one bunch ART 2310 re-hash HW#1, HW#2, HW#3, HW#4 tool making (rib and chamois)	Let's make some clay today! Slab making demo (roller & hand) Tile assignment clay 2
Week 2 **9/5** & 9/7	No Class- Labor Day	DUE: HW#1, HW#2, HW#3, HW#4 PowerPoint lectures techniques & slab artists
Week 3 9/12 & 9/14	Test #1 ART 2310 information Benchmarks for clay 2	Demo- ceramics 3-5
Week 4 9/19 & 9/21	Ceramics 2 – shellac demo Coil building on wheel and banding wheel (levels 3-5)	Terra sig demo (clay 2)
Week 5 9/26 & 9/28	CRITIQUE	Majolica demo
Week 6 10/3 & 10/5	Kilns lecture/ firing /shelves /programming / loading Low fire glazes & testing	Unload bisque / reload for cone 04 firing / 500g batch low fire glaze demo
Week 7 10/10 & 10/12	Intro slab project / mini crit in process/ Slab building demos / make slabs	Ceramics 3-5 demos
Week 8 10/17 & 10/19	Clay body lecture	Go over clay body sheet/ quick rehash
Week 9 10/24 & 10/26	Ceramics 3-5 demos	CRITIQUE
Week 10 10/31 & 11/2	Pottery wheel demo- cyinder, plates, bowls / high fire glaze buckets assignment	Visiting artist in studio working and evening lecture. Thursday crits with visitor
Week 11 11/7 & 11/9	Rehash bowls and plates ^9 Glazing part 1	Trimming bowls and plates demo ^9 glazing demo part 2. Load kiln on Saturday
Week 12 11/14 & 11/16	Fire gas kiln, kiln lecture, cone paks, make cone paks.	Unload gas kiln, schedule review/ final critique/ decals
Week 13 11/21 & 11/23	Terra sigillata making lecture & demo Part 1	Terra sigillata making lecture & demo Part 2
Week 14 11/28 & 11/30	Last day to work in wet clay ALL WORK uncovered and out of lockers today	Surface/ glaze work Last Bisque loaded for high fire pottery on Friday
Week 15 12/5 & 12/7	Last Bisque loaded Surface/ glaze work	Studio Clean-up Day Materials & Process Test #2 LAST ^9 kiln loaded Friday
Week 16 EXAM WEEK	Final critique during scheduled final exam time: all semester work (completed)	Wednesday, Dec. 14th 2:30pm-4:20pm

General studio class structure:

- The first part of class (usually an hour) is reserved for demonstrations, lectures, discussions, etc.
- The second half of class (most days) will be work time
- As discussed from syllabus, we will fill in the blanks as a class according to our class interests and motivations.

Weber State University Name _____

Office: Rm 131 (inside ceramics studio)
Instructor: Stephen Wolochowicz
Phone: 801.626.7066
E-mail: Swolochowicz@Weber.edu
Office Hours: By appointment

What you should already know from ART 2310

Ceramic processes and materials

Clay is a natural material that is created from the breakdown of igneous or granite rock. It is composed of alumina, silica and chemical water. Clay can be dried and reconstituted into a plastic state.

The chemical formula for clay is: $Al_2O_3 \bullet 2SiO_2 \bullet 2H_2O$ + Physical H_2O

A **clay body** is a combination of clays and other ingredients formulated for specific workable properties. Color, fired temperature and plasticity are some examples of workability.

Plasticity is the ability of clay to bend and shape without breaking.

Earthenware is clay that has a high porosity level and is fired at lower temperatures (1945°F). Terracotta planters are an example of earthenware. It contains large quantities of iron, which melts at lower temperatures, and typically will absorb moisture and water due to its porosity level.

Stoneware is clay that has low porosity levels and is refractory. When fired unglazed at high temperature (2235°F) it can hold water due to is tightly fused clay matrix.

Ceramic is clay material made permanent by heat. At a certain point (1100°F) the clay has become molecularly transformed by heat and will no longer break down into clay. It cannot be dried and reconstituted after this point. Reclaim only works with clay; wet, leather and bone dry

All unfired clay is called **greenware**.

The three stages of greenware are:

Wet clay - Moist, plastic and malleable. Joining method is just pressure. Wet clay sticks to wet clay.

Leather hard clay - Most of the moisture has been driven off, can be carved easily and made into rigid slabs for construction. Not plastic anymore. Slip and scoring is required for properly joining pieces of leather hard clay. Wet clay will not adhere to leather clay by pressure alone.

Bone-dry clay - All of the physical water has evaporated and is ready to be fired. This is the most fragile state of greenware. Wet and leather hard clay will not adhere to bone dry clay through any method. Your window to work has closed.

Bisque ware is unglazed ceramic ware. The first firing of bone dry greenware is also called a bisque firing. Firing wet or leather clay will cause an explosion. Water turns to steam. Steam is a powerful force. Think about trains!

Clay and ceramic is fired in a **kiln**. We do not “bake our work in an oven”. There are two main types of kilns. Electric fired and gas fired.

Wedging is kneading of clay to remove air bubbles and align the clay particles.

Warping of clay happens when clay is dried unevenly or the clay particles are not aligned.

Coil building is a historic and traditional hand building method where a form is constructed by joining rope like pieces of clay to create volumetric shapes.

Clay Shrinks when it dries, when it is bisque fired, and when it is glaze fired. The hotter the firing the more it can shrink. Typically 15-20% from wet to finished.

Trapping air inside clay will result in an explosion during firing. As hot air expands and the clay shrinks, pressure builds. Physics always prevails.

Thick and or **solid clay** forms are difficult to work with. As the clay shrinks during drying, the thick walls will dry unevenly promoting cracking. During firing, the heat has trouble penetrating thick clay walls resulting in uneven heating. The clay will shrink at different rates causing stress and ultimately cracking. Compression of wet clay also minimizes cracking issues. Compacting clay particles make the work stronger.

Prevent cracking by compression of wet clay, slow and even drying of greenware, and even firings.

Mason is the brand name our ceramic stains. **Mason stains** are stable ceramic colorants used to add color to slips, clay bodies and glazes. They are essentially glazes that were fired to extreme temperatures (hotter than our kilns) and pulverized into a powder. Since they will not re-melt their color is relatively stable and will not change.

Frit is a flux. It is a commercially made melting agent. Our common frit is labeled Ferro brand Frit #3124 or Frit #3134

Mixing a ceramics stain consists of equal parts Mason stain and frit plus water. This is not a glaze and is to be used as a wash, similarly to how you would use watercolor. It will flake off if it is apply thickly (as in a glaze application). Stains should be applied to bisque ware and needs to be re-fired to adhere to the ceramic work.

Slip can mean many different things. The three main types and their uses are: **Decorative slip** - colored slip designed for leather hard clay used in a painterly way.
Adhesive slip – slip and scoring as in joining two clay pieces that are leather hard.
Casting slip - liquefied clay body used for mold making. Toilets are slip cast.

Terra Sigillata is a surfacing solution that consists of ultra fine clay particles. It is not a slip or a glaze, as it contains just one ingredient, clay. Ideally, it is applied to bone dry clay but can work on all greenware. The eggshell sheen is achieved by burnishing with a tool or finger when the terra sigillata has dried to leather hard. Typically, three coats is plenty. Much more than that and the surface may flake off. Remember, it is not a glaze and has no fusing or fluxing action.

Glaze is a protective glass coating fused onto ceramic through a kiln firing process.
Glaze is applied to bisqueware only by brushing, pouring, dipping, and/or spraying. Glazes can be designed to melt at many different temperatures. Always make sure the clay body and glaze type are appropriately matched. In our studio, Red buckets are labeled as: *low fire, Δ04, cone 04*, and/or *1945°F*. These all signify earthenware temperatures. The green buckets are glazes designed for stoneware, or high fire gas kiln pottery. They are labeled as: *high fire, Δ10, cone 10,and/or 2250°F.* As with any glaze application, be sure the bottoms are unglazed. “Glaze is glue”, your piece will fuse to kiln shelf if not wiped clean.

Glaze is made up of three main ingredients:

Glassmaker	silica
Flux	melting agent
Stabilizer	clay (keeps the glaze from running off of the piece)

Additional ingredients of glazes:

Opacifier	tin, zirconium
Colorant	metallic oxide, mason stain

Vitrification is the point where a clay body is fired to its maturation point. The clay platelets are so tight and dense that the ceramic object is impervious to water penetration- thus able to hold liquids. The glaze is merely decorative and makes it easy to clean.

Tool kits items:


Fettling knife


Wooden knife / thumb tool

Needle tool / pin tool


Small loop tool


Large loop tool


Metal rib tool


Wooden rib tool


Wire tool


Throwing sponge


(2) Bamboo brushes


Sur Form rasp

Scraffito

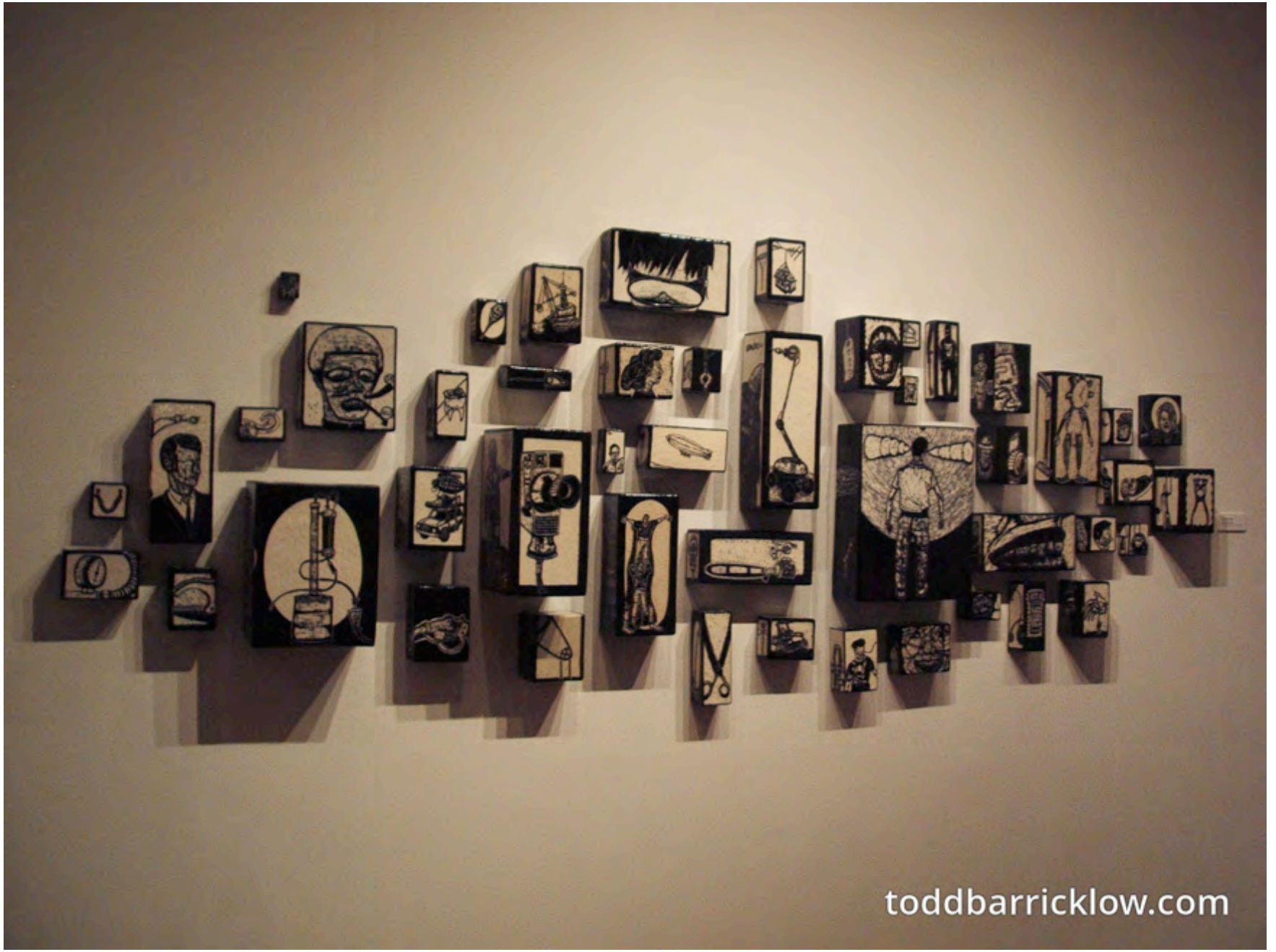
Rachel Bleil

Rachel Bleil

Rachel Bleil

Rachel Bleil

Rachel Bleil


toddbarricklow.com


toddbarricklow.com

Matthew Metz

Matthew Metz

Steve Lloyd

Steve Lloyd

Steve Lloyd

Kathy King

Kathy King

Kathy King

Kathy King

Kathy King

Chris Theiss

Chris Theiss

Chris Theiss

Chris Theiss

Chris Theiss

Majolica

Karin Kraemer

Karin Kraemer

Karin Kraemer

Karin Kraemer

Linda Arbuckle

Linda Arbuckle

Linda Arbuckle

Linda Arbuckle

Posey Bacopoulos

Posey Bacopoulos

Posey Bacopoulos

Posey Bacopoulos

Courtney Murphy

Shellac Resist

Jim Gottuso

Jim Gottuso

Jim Gottuso

Jim Gottuso

Andy Shaw

Andy Shaw

Andy Shaw

Steven Cheek

Steven Cheek

Ted Neal

Ted Neal

Ted Neal

Tim Compton

Other low fire options…

Steve Hanson

Ronan Peterson

Jessica Brandl

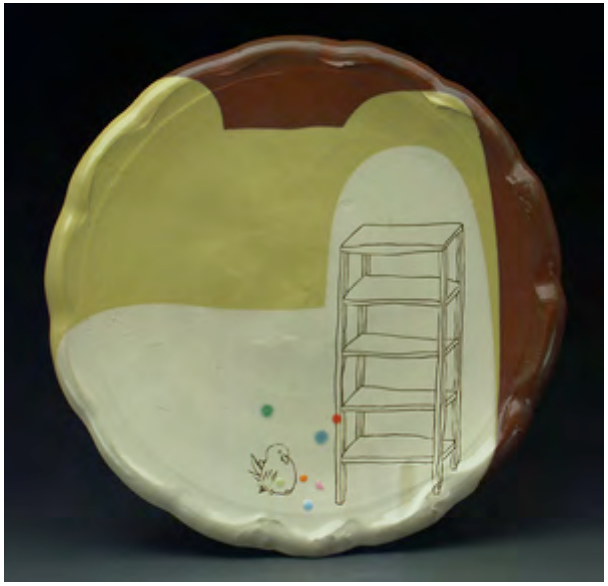
Sue Tirrell

Ashley Devitt

Scott Cameron Bell

Kip O’Krongly

Kelly Mckibben Harro



Ayumi Horie

Weber State University

MASON STAINS

Ceramic Stains (brand name “Mason”) are fired blends of metallic oxides and fritted material that have been calcined (fired up to 2600°F) and reground into a fine powder. This creates stability when employed to achieve little change in original color. Stains containing otherwise toxic oxides can be employed without significant dangers. They can be used to color transparent or opaque glazes, slips, engobes or clay bodies. The stains may also be used effectively as colorants for direct brush decoration when mixed with water and a *flux. More flux is required at the lower temperatures to melt the stain. Color results will vary according to glaze composition, firing temperature and kiln atmosphere. The quantity of stain used will vary between 1%-20% depending on the depth of color required. Most of the stains will produce the color indicated and remain stable up to 2300°F in both oxidation and reduction atmospheres. Some of the colors such as pink, yellow and purple can be volatile at higher temperatures, and in reduction atmospheres. Testing is recommended to determine stability.

Advanced:

Calcium oxide may affect the color of many stains. For best color development, calcium carbonate (whiting) should be added to the base glaze where indicated. See reference chart for details.

As zinc is chemically combined in some of the stains, free zinc can alter or destroy the intended color. Again, for the very best color results, follow the guidelines of the code numbers listed next to the stains.

Pastel colors can be produced by adding tin or zircon opacifiers in small amounts or by using mason extenders. Stains may be combined to produce new colors. Testing is necessary.

Consult Mason Stain chart or MasonColor.com for instructions

Stephen Wolochowicz

Weber State University

MIXING A STAIN

What is it?

A stain mixture is exactly that, a stain. It consists of; a mason stain, water, and a flux to enable it to adhere to your work in the kiln firing. It is NOT a glaze and does not work like one. Its primary purpose is to accent textured surfaces or create soft washes of color (much like diluted water color paint). It must be fired on or it will not adhere. Thick applications will flake-off as it must be used as its names suggests. Thin applications can be opaque or transparent depending on the amount of water used in the mixture. Must only be used on Bisqueware.

How do I mix it?

Use sparingly! A little goes a long way.

1) Choose a Mason Stain color you want as your accent.
2) Mix equal parts of stain color and Frit 3124 (low temperature melter).
   One tablespoon of each works well.
3) Add a small amount of water to achieve desired consistency
4) Done!

Process/ Application?

It can be brushed on and wiped away leaving stain in the groves and textures of your work. It can also be sponged onto bisqueware for added highlights adding new dimension to otherwise flat surfaces. Must be re-fired to adhere. Can repeat process numerous times. Please note that it will not adhere on top of previously glazed surfaces. Works well in conjunction with already fired terra sigalatta and slip applications. Clear glaze can be added, if desired, as the last firing.

Temperature range?

Since a stain mixture only has enough fluxing power to adhere and not melt, it can be used at any temperature range. It is wise to test as some colors wash out or fade in reduction or stoneware temperatures.

Stephen Wolochowicz

ULTRAFINE CLAY, USUALLY BALL MILLED, THAT IS TYPICALLY APPLIED TO GREENWARE AND POLISHED OR BURNISHED TO A SHEEN. IT HAS NO FLUX AND WILL NOT "MELT". YOU CAN APPLY TO BOTTOMS OF PIECES. USUALLY LOW-FIRED TO RETAIN SHEEN. BURNISH WILL FADE AS KILN TEMPERATURE INCREASES NOT RECOMMENDED PAST Δ04. BECAUSE THE APPLICATION IS SO THIN (ONLY A CLAY), GLAZES ARE ABLE TO FUSE INTO ITS MATRIX.

APPLICATION

1) WIPE GREENWARE WITH DAMP SPONGE. FLAKING WILL OCCUR IF DUST IS PRESENT.
2) APPLY 3-4 COATS
3) ONLY NEED TO BURNISH (WITH FINGER) LAST COAT AT LEATHER HARD

COLORS

MASON STAINS CAN BE ADDED FOR ADDITIONAL COLOR OPTIONS. USE SPARINGLY. IF IT WILL NOT BURNISH, YOU ADDED TOO MUCH STAIN TEST MIXTURE FIRST!

BALL CLAY SIG (OFF-WHITE)	EPK SIG (WHITE CRACKLE)	REDART SIG (IRON RED)
1500 g OM#4	1500 EPK	1500g RIO
10,000 g H_2O	10,000 H_2O	10,000 g H_2O
30 g darvan7	30 gram darvan7	30 g darvan7

* BALL MILL 8 hrs, pour out + LET SIT 24 hrs, DECANT H_2O ON TOP, SLOWLY POUR SIG (MIDDLE) INTO CONTAINER, LEAVE BOTTOM SLUDGE (GARBAGE) * Hydrometer Reading (1.15 - 1.20)

What is slip?

Slip is a word that is used to mean different things depending on what it is used for. The common thread is that slip is a mixture of clay and water

There are three basic types of slip:

1) Adhesive or joining slip- slip and score. The clay body used makes the best slip for joining as is has all of the same properties. Slaking down some dry clay pieces in water and decanting the excess water will provide a good start. Mix or even blend into a paste for best results

2) decorating slip. Some clay bodies have grog or other coarse material and occasionally darker clays like Redart that do not contribute to a smoother whiter base slip color. Decorative slips are essentially a redesigned clay body for liquid application as decoration or to cover over a clay that fires to an unattractive color. They should be applied to leatherhard clay and have the same shrinkage to make a good fit. Decorative slips can be colored with metallic oxides (charts are available for percentages) or Mason stains up to 20% by weight to dry mix to achieve desired colors.

3) casting slip. A liquefied deflocculated clay body primarily used in plaster molds to extract complex shapes or multiples of the same object. restroom toilets are an example of slip cast ceramics.

What is an engobe?

Engobes are slips that have a broader range of application. Most engobes have more fluxes in them such as frit or feldspars to help melt and fuse to bone dry or even bisque ware. They are on the border of being classified as a dry glaze.

What is a Mason Stain?

Ceramic stains and brand names like Mason are commercially manufactured colorants for clays and glazes. A good way to think of them- They were once a glaze fired hotter than we can fire our kilns, then pulverized into a powder. We can never re-melt the stain into a glaze and therefore it is a stable colorant. They can add a refractory quality and is a good idea to offset this with the addition of an equal part of frit 3124.

What is a metallic oxide?

Chromium, cobalt, copper and other oxides or carbonates are the earth metals used to make ceramic stains. They are less stable and have different melting temperatures and effects such as mottling or speckling. Most glazes are usually made from these because the fired effects are more desirable than the flatness of ceramic stains.

How to mix a colored slip:

What you need:

Drill with mixer blade- mix white slip
2 containers, #1 and #2
Mason Stain colorant (middle cabinet only)
^04 low fire white slip
Something to mix small batch with (large brush)

1)
Add appropriate mixed white slip into a quart container #1
How much slip do you need? A little goes a long way.
Example: ½ quart container enough for 3 coats on historical replication project.

2)
You will need 3-4 tablespoons of Mason Stain colorant per ½ quart of slip used. Adjust accordingly for larger or smaller batches. Ideally 20% of stain to dry material volume.

3)
In Container #2, add approximately a ¼ inch of water. Mix measured colorant into a small amount of water to break up powder into a solution. Use more water if needed.

4)
Add Mason stain solution to the slip in container #1 and mix well.

5)
Thin out as needed by adding water. It should brush on easily without clumps or difficulty.

Using Slip:

Designed for leather hard clay only

Ideally, work light to dark. You will need 3 coats of white to achieve correct opacity. Be careful not to apply thick coats as they may flake off. A good rule of thumb is, “what you see is what you get”. The base color/coat should be 2-3 coats to ensure opacity. You must wait for each coat to dry before re-applying. Otherwise you are not adding layers only smearing more on top. You know it is ready when it is dry to the touch – 15 minutes approximately.

∆04 White Slip

2500 EPK
2500 Ball Clay
1200 Silica
1300 Gerstley Borate
1300 Nepheline Syenite
1200 Frit 3124
2500 Zircopax

∆04 Red Slip

10000 Redart
1000 Frit 3124

∆04 Black Slip

2500 EPK
2500 Ball
1200 Silica
1300 Gerstley Borate
1200 Frit 3124
2000 Black Mason Stain

Weber State University

How to Mix a Colored Slip

What is it?

Slip is a mixture of clay and water thinned to a brushable consistency. Slips are colored by the addition of Mason Stain colorants or metallic oxides. Stains are more stable and will make more even colors. Metallic oxides can flux or contribute to speckled effects. Our decorative slips are mostly clay. The best base slip is the claybody itself. However a reformulation is required for red earthenware claybodies where white and white-based colors are desired. Slips remain porous after firing and thus can accept glazes and other post firing surfacing solutions.

How do I mix it?

By weight:

5-10% by weight for glazes
10-20% by weight for slips

By eye:

In a separate container (pint size), mix a tablespoon of Mason Stain and tablespoon of Frit #3124 with water to break up thoroughly. Add white slip (1/2 pint) to this and mix well.

TIPS:

- Use just enough water to break up the Mason and frit powder (prevents streaks)
- Use sparingly but make enough to complete project
- Label container if extra material is left over (so others can use it too)
- Colors will darken in the kiln and even more with a clear glaze over top

Process/ Application?

Slip is designed for leather hard clay only. What you see is what you get. Brush strokes are common. White slips will take three coats to fully cover the area (opacity). Black sometimes only needs one or two coats. It is a visual estimation on the required amount. You must allow each coat to dry to the touch before a new coat is applied. If not, you will smear the previous slip and not add a new layer or coating to it. Typically 15 minutes for drying time.

Thinning out the slip with water can help with the brushability. Too thick of an application can result in flaking off. A thin but opaque application with flowing viscosity is recommended.

Adding a Tbsp. of gum solution can greatly increase the flow and application properties of a slip.

Temperature range?

Ideally earthenware temperatures (Cone 04). However, since it is mostly comprised of clay, our shop slip can reach stoneware temperatures with little or no fluxing action.

Stephen Wolochowicz

Jeremy Randall

Slab, Slip, Stains, Occasional Glaze

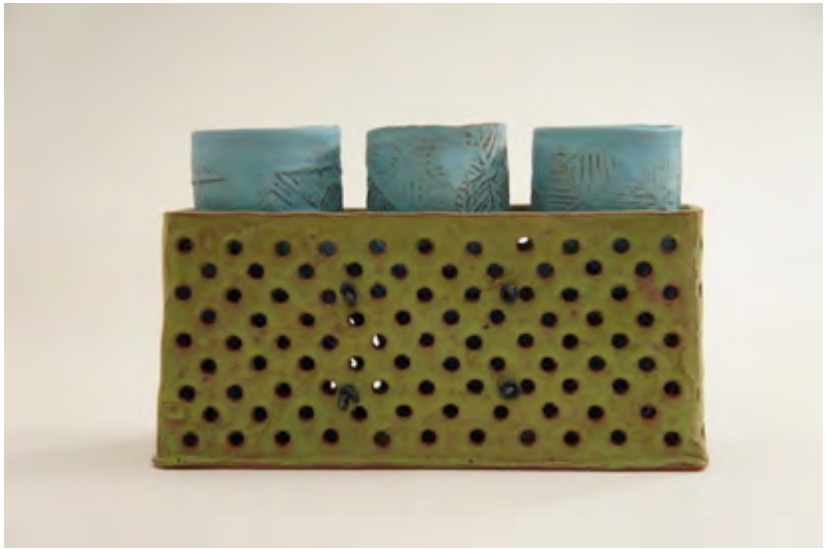
Joesph Pintz

Slab, Slip, Stains

Kenneth Baskin

Slab, Slips, Stains, Colored Clay, Atmospheric Firings

Sunshine Cobb



Terracotta, Slab, Slip, Glaze

John Mason

Slab, Slip, Glaze

Anne Currier

Slab, Glaze

Anita Powell

Slab, Narrative, Underglaze

Akio Takamori

Slab, Slip, Glaze

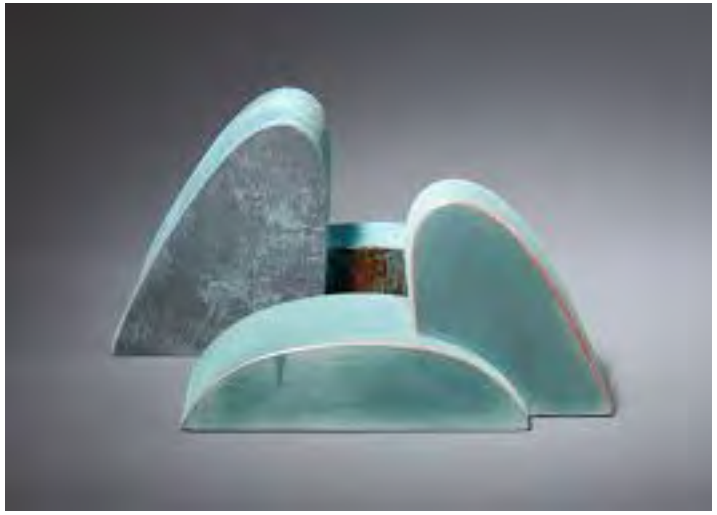
Sam Chung

Slab, Glaze

Chris Gustin

Slab & Thrown/Altered

Lynn Duryea

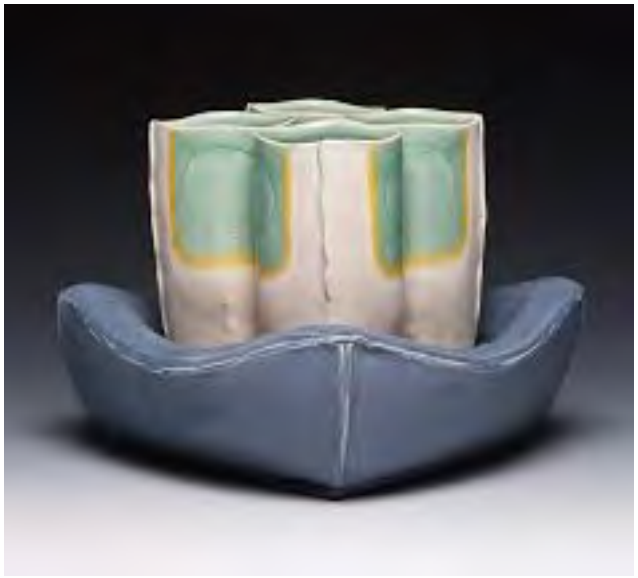


Slab, Slips, Glaze

Marty Fielding

Slab, Slip, Stain, Glaze, Terra Sigillata

Chris Pickett



Slab, Glaze

Marc Digeros

Slab, Resist, Glaze

Katherine Morling

Slab, Underglaze (slip)

Scott Dooley

Slab, Stain, Glaze

Peter Christian Johnson

Slab, Stain, Slip, Glaze

Gerard Justin Ferrari

Slab, Slip, Glaze, Colored Clay

Yi-Wen Kuo

Slab, Glaze

Doug Herren

Slab, Wheel, Glaze, Paint

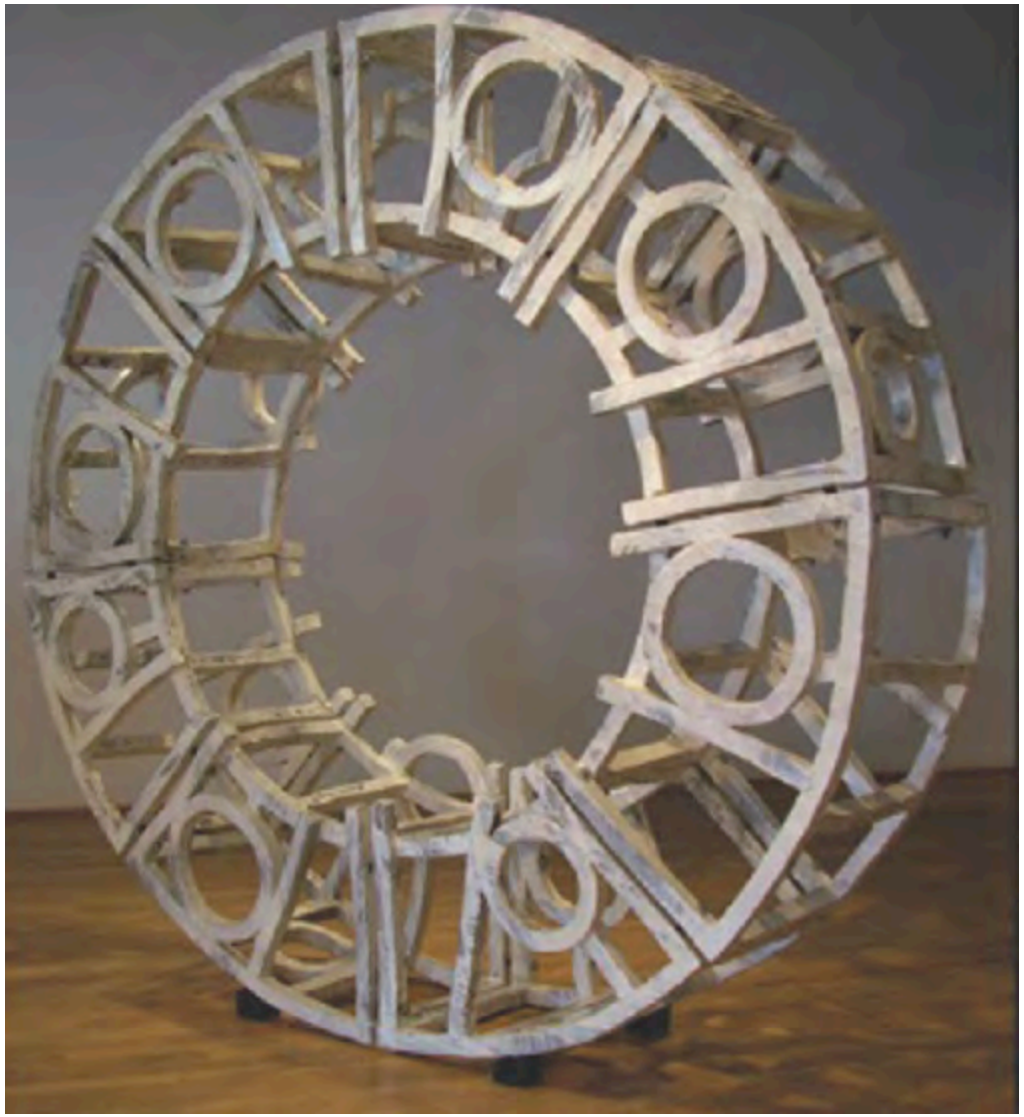
Aaron Benson

Slab, Glaze, Mixed Media

Nancy Selvin

Earthenware, Slip, Decal

Brandon Reese

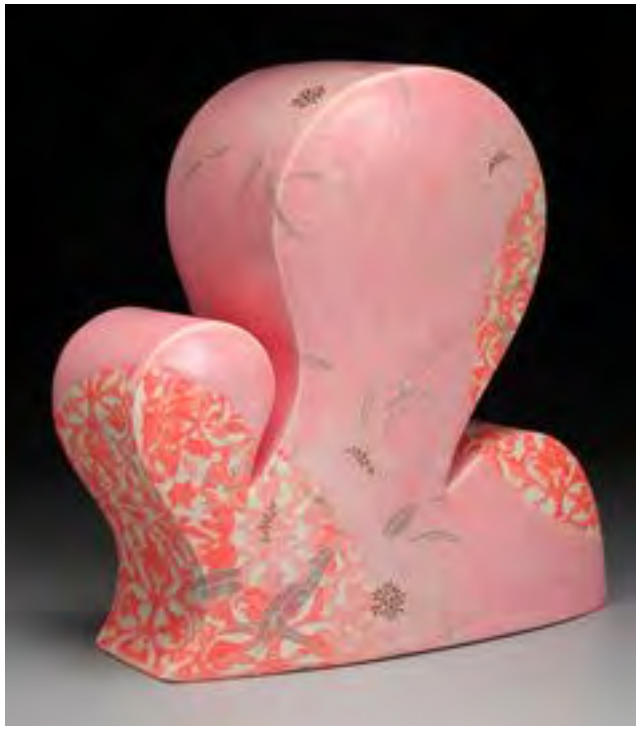


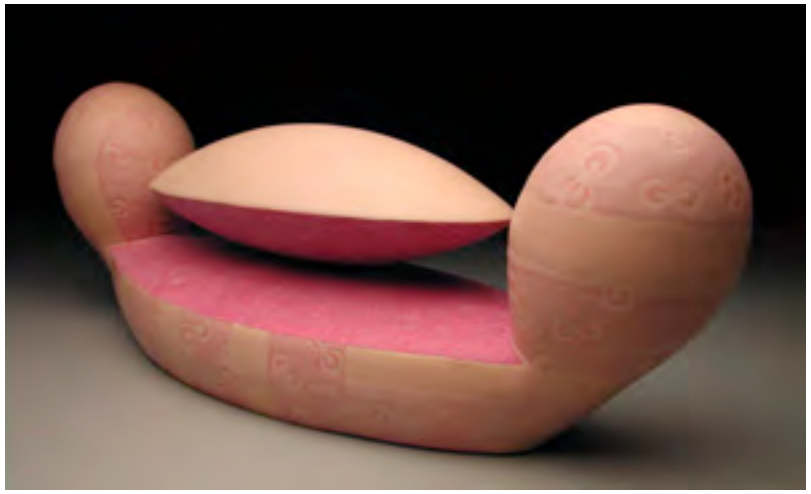
A

John Brickels

Slab, Unglazed

Erin Furminsky



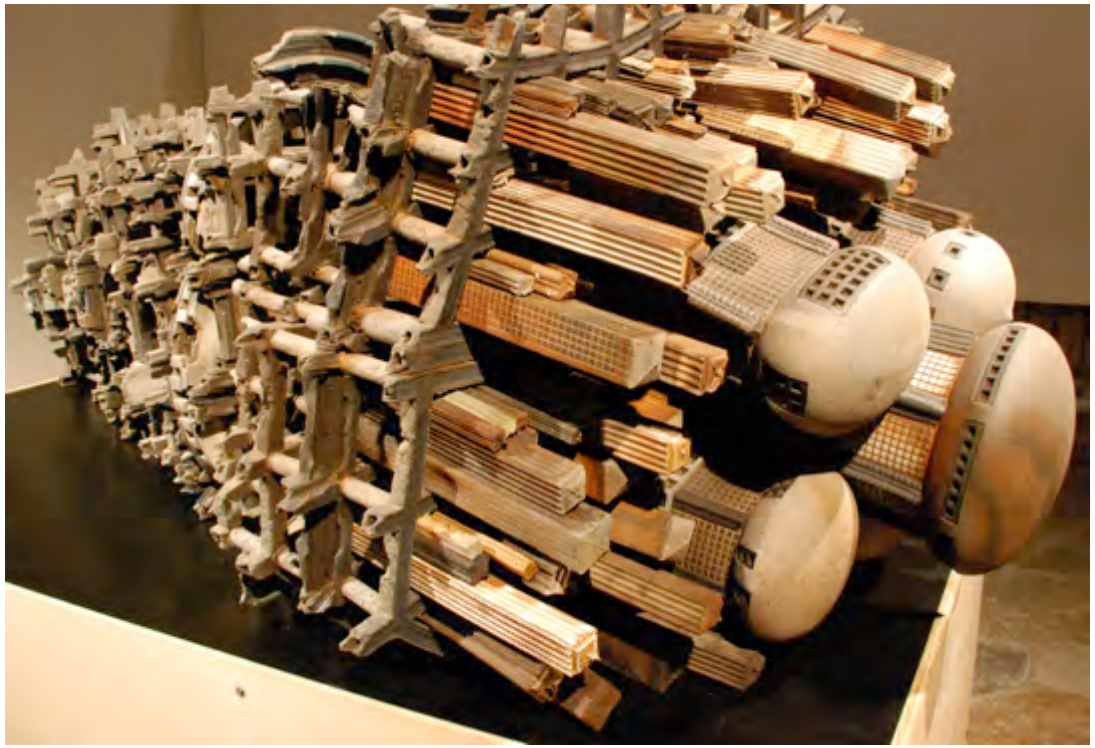


Slab, Underglaze, Glaze, Decal

Liz Howe

Slab, Slip, Glaze

Denny Gerwin

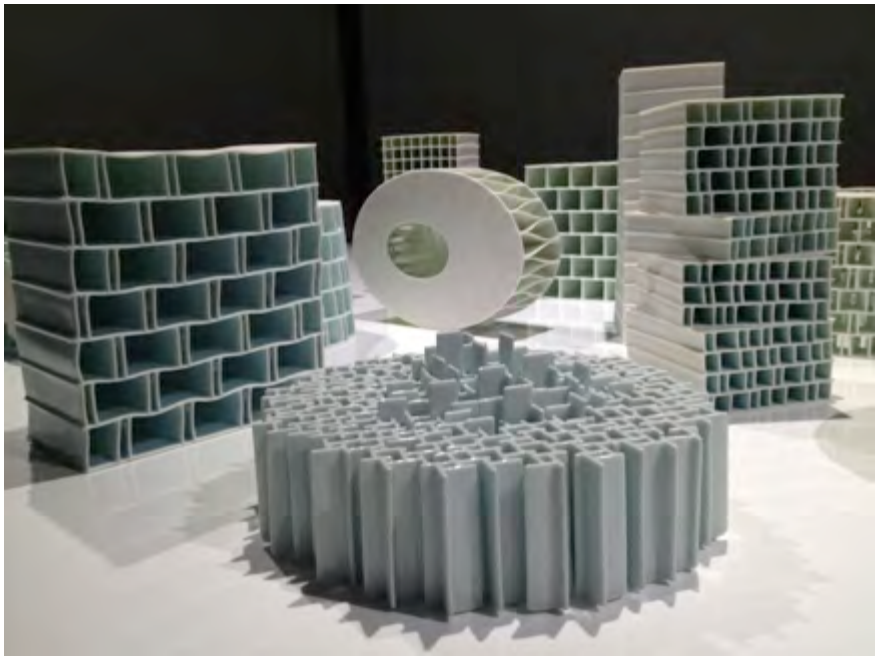


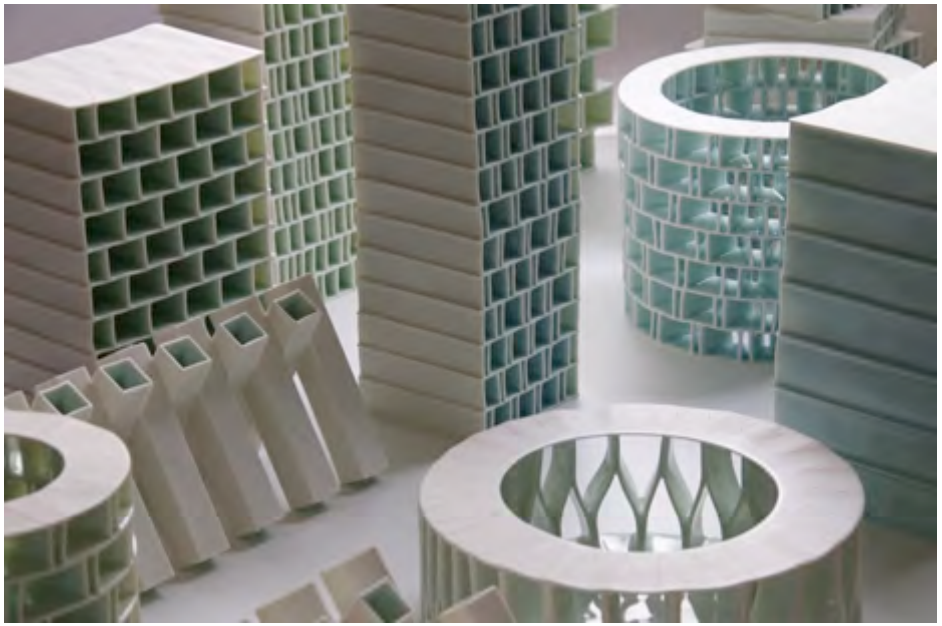
A

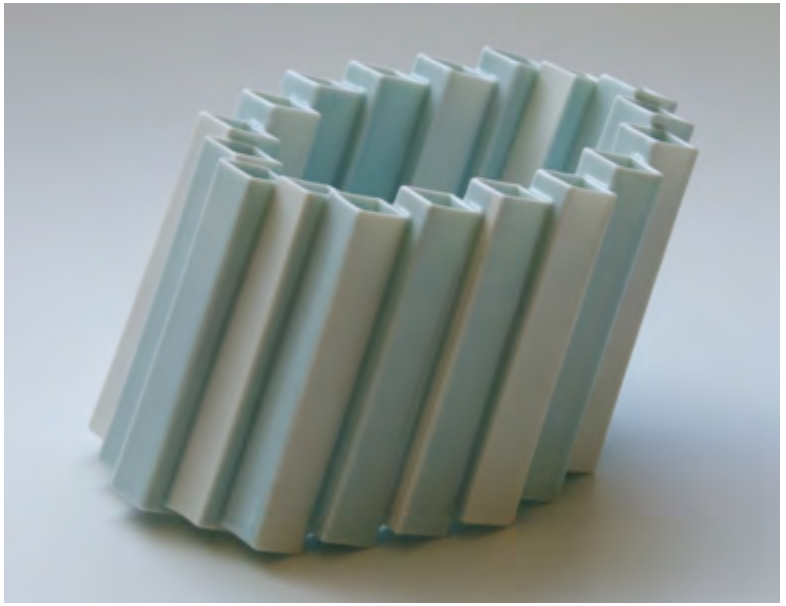
Rain Harris

Slab, Glaze, Decal

Kenji Uranishi







Translucent Porcelain

CLAY AND CLAY BODIES

Clay is hydrated silicate of aluminium. It can be molded into shapes and hardened with extreme heat to become waterproof.

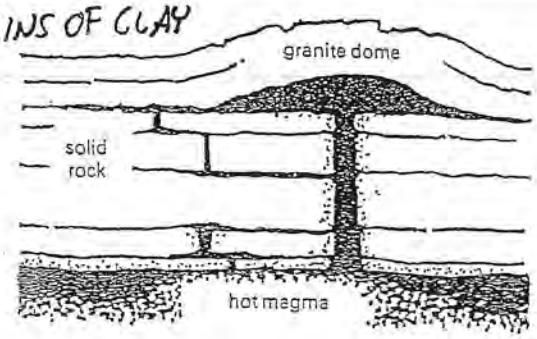
The chemical formula for clay is: $Al_2O_3 - 2SiO_2 - 2H_2O + physical\ H_2O$
(Alumina – Silica – Chemical Water + Physical Water)

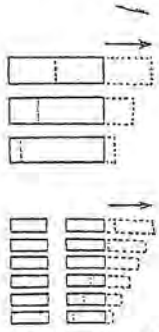
Clay originates from igneous and/or metamorphic rock. Hot magma was pushed upward and cooled under granite domes eventually cooling and forming rock. Over the next millions of years, trapped gasses decomposed the rock into feldspar. Feldspar is all clays parent rock. From there it further breaks down into silica and kaolinite. Kaolin is known as a primary clay. Kaolin is the purest and whitest type of clay available. They also exhibit minimal shrinkage due to large particle size. As this parent rock weathers and erodes over time, it picks up impurities becoming more plastic. Clays that have traveled away via glacier, volcano, weathering, etc. from the parent rock are called secondary clays. Ball clays and fire clays are examples of secondary clays. Plasticity is the clay's ability to bend and stretch without breaking. Two things help determine plasticity in clay. They are: particle size (microscope) and organic material. The smaller the particle size the more plastic the clay will be. The larger the particle size the less plastic the clay will be. Clay shrinks when it dries and when it is fired. The physical water evaporates bringing the particles closer during drying. The Chemical water is burned off up to 1200F degrees. After that, the increasing heat brings all the particles closer. Plasticity is also directly related to shrinkage. The larger the particle size the less plastic. The smaller the particle size the more plastic. This is why we add coarse materials like fireclay and grog to thicker hand-built forms (less shrinkage = less potential cracking). Highly plastic clay bodies like porcelain can shrink up to 20% where as sculpture bodies made mostly of refractory materials can be as little as 5% shrinkage overall. Plasticity is one of many considerations when choosing a clay body. A clay body is a combination of many clay and non-clay ingredients that are mixed for desired properties. Color, fired temperature, porosity (vitrification), plasticity, etc., are considerations when using a clay body. The intended use should be reflected in the recipe. Is it to be used for throwing, hand building, or both? Large-scale, miniature, thinned walled and thick walled to solid are also considerations when using a clay body. Clay bodies are generally grouped into three categories; earthenware, stoneware, and porcelain. Earthenware is low temperature while stoneware and porcelains can reach extreme temperatures without melting. Sometimes you will hear terms like low fire, midrange or high fire. They are fired temperature ranges and shouldn't be confused with a clay body type. All clay will vitrify and some temperature. Vitrification, or glassification, is when the clay body becomes so dense that it becomes impervious to water penetration. This is why you cup holds water. After a clay body is heated past its vitrification point, it will begin to melt. This is why low fire earthenware cannot be fired to stoneware temperatures. It would simply turn into a puddle then harden when it cools- a very costly mistake. Some clays are refractory, or resists melting, while others can be an active flux. A flux is a melting agent. Sometimes we use fluxes like feldspars, talc, magnesium, etc. to bring down the melting point of a clay body. We call this a eutectic relationship- the effect of a material's melting properties (temperature) on other materials melting properties due to heat.

Clay body ingredients we use:

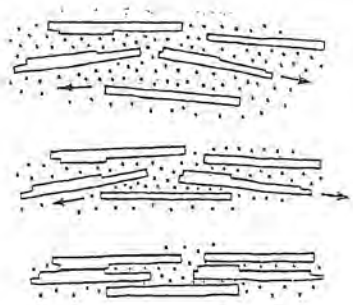
Type	Properties	Brand Names
Kaolin	whiteness, low shrinkage, refractory	EPK, #6 TILE, HELMER, GROLLEG
Bentonite	highly plastic primary clay (very unique)	BENTONITE
Ball Clays	added plasticity	OM#4, TENN#10, SAGGER
Earthenware	high iron red clays (think terra cotta)	REDART
Fire Clay	low plasticity, refractory	GOLDART, GREEN STRIPE, KYANITE HAWTHORNE BOND, AP GREEN
Pyrophyllite	reduce thermal expansion	PYRAX
Talc	white earthenware	PIONEEER
Wollastonite	reduces shrinkage	VANSIL W-20
Feldspar	main flux – glaze fit	CUSTER, NEPHELINE SYENITE, MINSPAR
Silica	glass former	
Silica Sand	white- refractory, reduce shrinkage, comes in different mesh sizes	
Grog	refractory, reduce shrinkage, comes in different mesh sizes	
Mollochite	white- porcelain grog	

ORIGINS OF CLAY



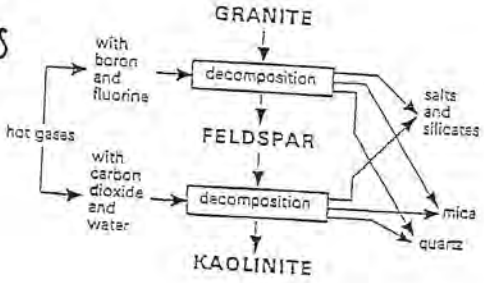


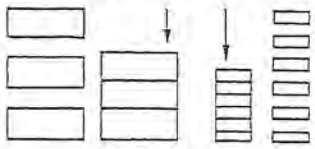
SHRINKAGE

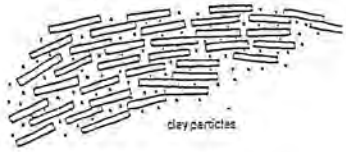


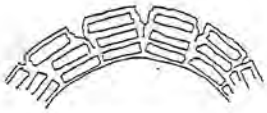
H_2O PRESENT

BREAKDOWN OF IGNEOUS ROCK

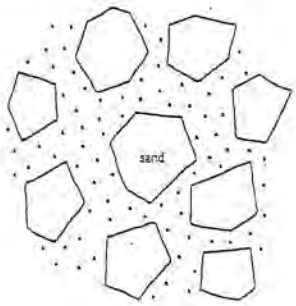


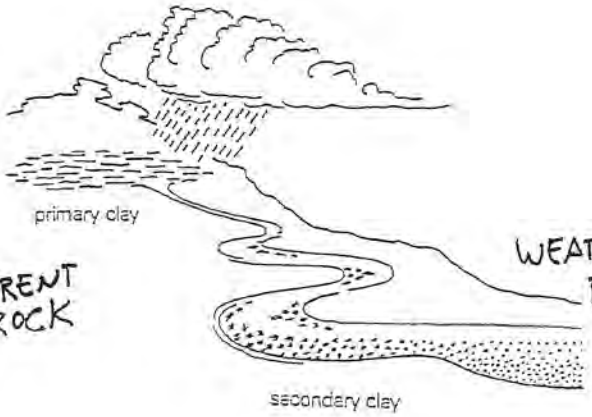






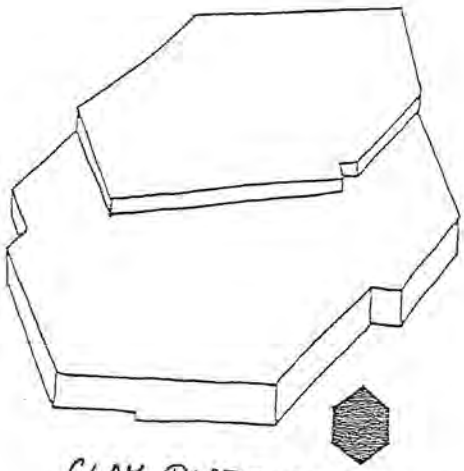
PLASTICITY





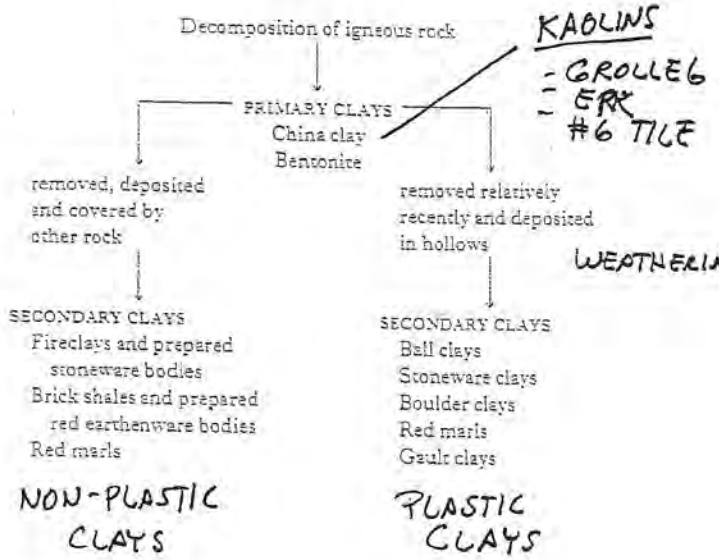
PARENT ROCK

WEATHERING / ERODING FROM PARENT ROCK



CLAY PLATELETS

Simplified origin of clays



KAOLINS
- GROLLEG
- ERK #6 TILE

WEATHERING/ERODING

NON-PLASTIC CLAYS

PLASTIC CLAYS

		Δ04 Red Throwing Clay	Δ04 Red Sculpture Clay	Δ04 Stephen's Red	Δ10 Shop Stoneware	Δ10 Shop Stoneware (large scale)	Δ10 Voulkos Clay (large scale)	Δ10 Anderson Ranch Porcelain	Δ10 WSU Porcelain #2					
Custer Feldspar (potasium)					15	12	15	20	30					
Minspar Feldspar (sodium)														
Nepheline Syenite Feldspar		5	10	10										
Spodumene (Lithium Feldspar)		3												
Silica		12		10				12	10					
Grolleg Kaolin								27						
Edgar Plastic Kaolin (EPK)									50					
#6 Tile Kaolin								27						
Bentonite		2						2						
OM#4 Ball Clay		20	12	15	15	12	20		10					
XX Sagger Ball Clay														
SPG Ball Clay														
Old Hickory #5 Ball Clay														
Hawthorne Bond Fire Clay														
Imco 400 Fire Clay														
Greenstripe Fire Clay		20	50	20	29	25	25							
Goldart			10	5	42	38	20							
Redart		50	50	50										
Talc		5		5										
Pyrax								12						
Kyanite 48 mesh				1										
Kyanite 35 mesh				1										
Fine Grog			10	10		5								
Medium Grog						4								
Coarse Grog			10			4	20							
Molochite														
Silica Sand														
Wollastonite				1										
Barium Carbonate		.5	.5	.5										

Earthenware (low fire)

∆04 Red Sculpture Clay

50	Redart Clay
50	Greenstripe Fire Clay
10	Nepheline Syenite
12	OM#4 Ball Clay
10	Goldart Clay
10	Course Grog
10	Fine Grog
0.5	**Barium Carbonate (optional)

∆04 Red Throwing Clay
(majolica)

50	Redart Clay
20	OM#4 Ball Clay
20	Greenstripe Fire Clay
12	Silica
5	Talc
5	Nepheline Syenite
3	Spodumene
2	* Bentonite
0.5	** Barium Carbonate (optional)

* *Must be premade prior*
** *Must be diluted first (toxic)*

∆04 Stephen's Red

50	Redart
20	Fire Clay
20	Ball Clay
12	Silica
10	Fine Grog
5	Talc
5	Nepheline Syenite
0.5	**Barium Carbonate

∆04 Stephen's '16 Red

50	Redart
20	Fire Clay
5	Goldart
15	Ball Clay
10	Silica
10	Fine Grog
1	Medium Kyanite
1	Fine Kyanite
10	Nepheline Syenite
5	Talc
0.5	** Barium Carbonate
1	Wollastonite
0.5	* Veegum Cer (*or* Additive A)

White Stoneware (high fire)

∆10 WSU White Stone

30	#6 Tile Kaolin
20	EPK
10	Ball Clay
10	Goldart
10	Fire Clay
12	Custer Feldspar
8	Silica

Stoneware (high fire)

∆10 Voulkos Clay

25	Fire Clay
20	Goldart
20	Ball Clay
20	Coarse Grog
15	Custer Feldspar

∆10 Balistreri Sculpture Clay

60	Ball Clay
40	Feldspar
60	Goldart
60	Medium Grog
60	Fire Clay
1	* Bentonite

∆10 Shop Stoneware

(Good for wheel, slab and small sculpture)

3	Goldart
2	Greenstripe Fire Clay
1	OM#4 Ball Clay
1	Custer Feldspar

For larger sculpture also add:

1	Fine Grog
1	Coarse Grog

Porcelain (high fire)

∆10 25% mix Porcelain (#1)

25	Silica	
25	Feldspar	(Custer)
25	Kaolin	(EPK)
25	Ball Clay	(OM#4)

∆10 WSU Porcelain #2

85	EPK
50	Custer Feldspar
15	OM#4 Ball Clay
15	Silica

∆10 WSU Porcelain #3

50	Custer Feldspar
50	EPK
35	#6 Tile Kaolin
15	Silica
15	OM#4 Ball Clay
1.5	* Bentonite

∆10 Anderson Ranch Porcelain

42	Grolleg
42	#6 Tile
30	Custer
20	Silica
20	Pyrax
3	Bentonite

KILN FIRING CHART

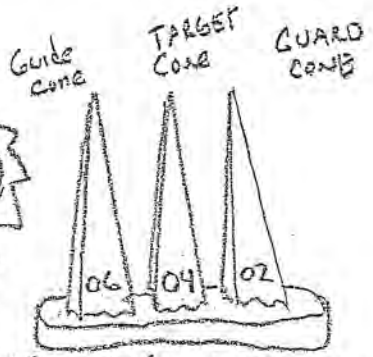
Firing converts ceramic work from weak greenware into a strong, durable form. As the temperature in a kiln rises, many changes take place in the clay; and understanding what happens during the firing can help you avoid problems. The following chart provides highlights of what happens when firing clay.

Temperature C°	Temperature F°	Color	Cone (approx.)	Event
1400	2552	Brilliant white	14	End of porcelain range
			13	
			12	
1300	2372	White	11	End of stoneware range
			9	
		Yellow-white	7	
1200	2192		5½	End of earthenware (red clay) range
		Yellow	4	
			2	Between 1100-1200°C, mullite and cristobalite (two types of silica) form when clay starts converting to glass. Clay and ceramic particles start to melt together and form crystals. These changes make the material shrink as it becomes more dense. Soaking (holding the end temperature) increases the amount of fused matter and the amount of chemical action between the fluxes and the more refractory materials.
1100	2012	Yellow-orange	1	
			04	
		Orange	05	
1000	1832		06	
			07	
		Red-orange	08	
900	1652		010	Between 800-900°C sintering begins. This is the stage where clay particles begin to cement themselves together to create a hard material called bisque.
			012	
		Cherry red	013	
800	1472		015	Between 300-800°C, the temperature must be raised steadily and ample air must be present to permit the complete burning of carbonaceous materials (impurities in the clay along with paper, wax, etc.). After 800°C, the clay surface will start to seal off, trapping unburned carbonaceous materials and sulfides, which could cause bloating and black coring.
			016	
		Dull red	017	
700	1292		018	
			019	
		Dark red	020	
600	1112		021	Quartz inversion occurs at 573°C. When clay is refired for a glaze firing, quartz crystals change from an alpha (α) crystal structure to a beta (β) crystal structure. The inversion is reversed on cooling. This conversion creates stresses in the clay so temperature increase and decrease must be slow to avoid cracking the work.
			022	
		Dull red glow		
500	932			
		Black		
400	752			Between 480-700°C chemical water (referred to as "water smoke") is driven off.
300	572			Upon cooling, cristobalite, a crystalline form of silica found in all clay bodies, shrinks suddenly at 220°C. Fast cooling at this temperature will cause ware to crack.
200	392			
100	212			Water boils and converts to steam. Trapped water will cause clay to explode so all water should be evaporated below 100°C. Begin a firing by keeping the kiln below 100°C until all water has evaporated.

CONE PAKS

OR CONE PACKS
OR CONE PLAQUES

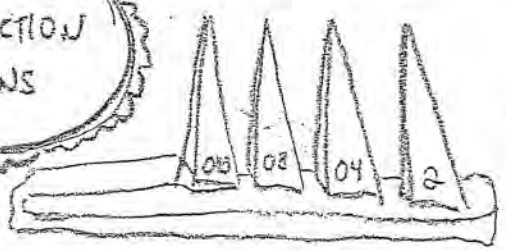
FOR Δ04 FIRING ELECTRIC KILNS



(1828°F) (1945°F) (2016°F) ← SKIP CONES (NO Δ05 OR Δ07)

WITNESS CONES OR VISUAL CONES

Δ9 REDUCTION GAS KILNS

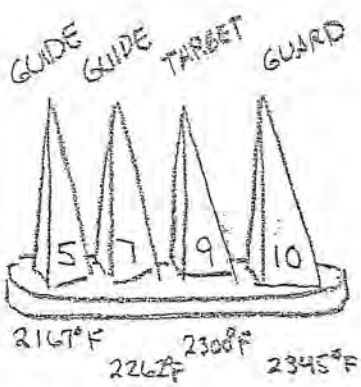


* ALL CONES SHOULD SIT THE SAME WAY. THE ANGLE (ABOUT 10°) WITH NUMBERS VISIBLE. CROOKED CONES CAN FALL SIDEWAYS + MELT ONTO SHELVES OR GIVE MIS-READS

NEED A CATCH BASIN. THESE CONES WILL PUDDLE, PREVENT DRIPPING ON SHELVES

Δ010 GUIDE
Δ08 TARGET FOR START OF REDUCTION
Δ04 MISSED REDUCTION START
Δ2 GUIDE CONE - START TO SEE IF KILN IS EVEN

NO CATCH BASIN NEEDED FOR THIS PAK, CONES WILL NOT PUDDLE



(1/4" PAD)

THIN CLAY SUPPORT. REMEMBER THIS IS WET/GREENWARE AT START OF GLAZE KILN. TOO THICK IT WILL BLOW UP. THE KILN JUMPS TO 500°F WITHIN MINUTES OF STARTING...

- Δ5 + Δ7 ARE FOR EVENING OUT KILN TOP + BOTTOM
- IF YOU WAIT UNTIL Δ9 STARTS, YOU HAVE MISSED YOUR TIMING

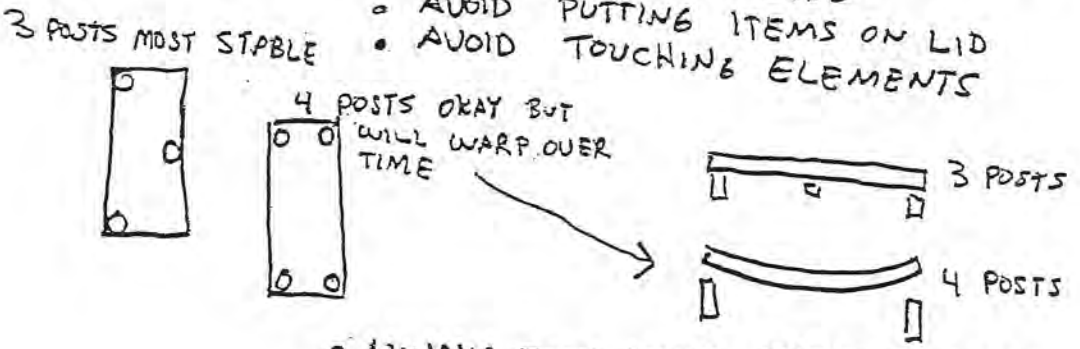
KILNS

SHELVES
- ALUMINA (GAS/ELECTRIC ΔII MAX TEMP)
- COORDERITE (Δ6 MAX TEMP)
- SILICON CARBIDE (GAS KILN ONLY MUST BE IN REDUCTION ATMOSPHERE AFTER 1800° F)

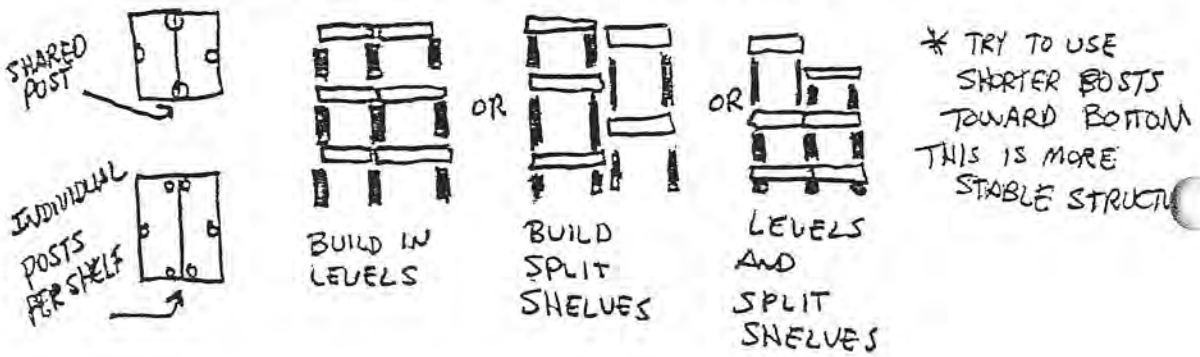
KILN WASH
- PROTECTIVE CLAY WASH ON SHELVES TO AID IN DETACHING GLAZE RUNS
- ONE SIDE ONLY (you don't want kiln wash flaking on your glazed work)
  - 50% EPK
  - 50% ALUMINA HYDRATE

STORAGE OF SHELVES
- UPRIGHT
- WASH SIDE FACING WASH SIDE
  - 3-4 deep only
- NEVER STACK HORIZONTAL (BREAKAGE)

LOADING KILNS
- ALWAYS CHECK SHELVES FOR CRACKS (BOTH SIDES)
  - AVOID LEANING ON KILNS
- AVOID TOUCHING OR BANGING SHELVES ON THERMOCOUPLES
- AVOID SLAMMING LIDS
  - AVOID PUTTING ITEMS ON LID
- AVOID TOUCHING ELEMENTS



- ALWAYS POST ABOVE PREVIOUS POSTS
  - YOU CAN SPLIT SHELVES AND POSTING



ELECTRIC KILN PROGRAM EXAMPLE

"ENTER" MOVES THROUGH THE PROGRAM

- USER #1
- 3 SEGMENTS (RAMPS)
- RAMP #1
  - * 50°F/hr.
  - * 220°F
  - * 2hr Hold

  } STEAM
- RAMP #2
  - * 125°F/hr.
  - * 1064°F
  - * 15 MIN hold

  } QUARTZ INVERSION
- RAMP #3
  - * 125°F/hr.
  - * 1945°F (Δ04)
  - * NO HOLD

  } FINISHING TEMPERATURE OR CONE
- ALARM * "9999"
- PRESS "ENTER" UNTIL KILN TURNS ON

BISQUE RANGE

1650°F	Δ010	LOW END
1825°F	Δ08	NORMAL
1825°F	Δ06	NORMAL
1945°	Δ04	HIGH END

GLAZE RANGE

- ALWAYS FIRE SAME SPEED
- COOLING CAN EFFECT GLOSS
- CONTROL VARIABLES FROM TESTING
- DOCUMENT FIRING SCHEDULES

* BREAKDOWN
- 3 TEMP CHANGES = 3 SEGMENTS = 3 RAMPS
- R#1 HOLD AT STEAM
- R#2 HOLD AT QUARTZ INVERSION (THICK OR LARGE WORK NECESSARY; THIN WALLED POTTERY NOT SO NECESSARY)
- R#3 CLIMB TO FINISHED/TARGET TEMPERATURE

* SOME BASIC FIRING CONCEPTS

- THIN WALLED POTTERY 300°F/hr.
- THICK PIECES (1 inch) 50-75°/hr.
- TALL PIECES OR SLIP+SCORED PIECES 125°F/HR.
- SOLID PIECES (OVER 1 inch) 5°-10°F/HR.

PROGRAMMING ELECTRIC KILNS

1) TURN ON MAIN POWER BREAKER BOX

2) HOOD VENTS ACTIVATE WHEN KILN HAS POWER
(NOT USING KILN? TURN OFF ITS POWER SUPPLY)

3) L&L KILNS EASY FIRE PRE-PROGRAMS

- SELECT
  - SLOW BISQ
  - FAST BISQ
  - SLOW GLAZE
  - FAST GLAZE
- ENTER "CONE" NUMBER
- NO "HOLD"
- * ALARM SHOULD BE "9999"
- "START"

4) L&L KILNS USER PROGRAMMING

- SELECT A USER NUMBER (1-5)
- SELECT NUMBER of SEGMENTS
  (HOW MANY CHANGES DURING FIRING?)
- example: 2 SEGMENTS
  - RAMP 1
  - RAMP 2
- A "RAMP" is
  - HOW MANY DEGREES of CLIMB PER HOUR
    (example: 125°F/hr.)
  - TO WHAT TEMPERATURE?
  - HOLD?

ALARM IS ALWAYS TO BE SET AT "9999"
(LAST QUESTION ASKED ON PROGRAM)

MIXING 500 gram BATCHES

(deli Container
1 quart size = 500g)

1) LABEL CONTAINER "A" WITH SHARPIE

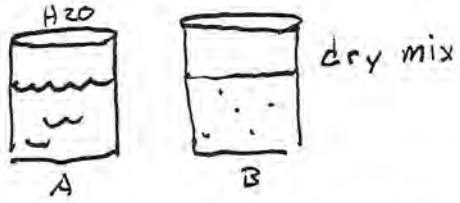
2) WEIGH OUT DRY INGREDIENTS IN CONTAINER "A"

3) MIX DRY MATERIALS (WITH LID ON IS BEST)

ex. Δ04 - 100
BLUE CLEAR
250
150
100
1

4) TRANSFER "A" TO CONTAINER "B"

5) H_2O IN CONTAINER "A" TO SAME LEVEL AS "B"



6) SLOWLY ADD MIXED DRY MATERIAL TO WATER "A"

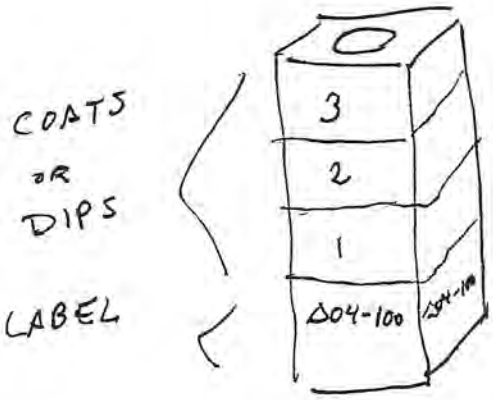
7) LET SIT / SLAKE DOWN (OVERNIGHT IS FINE)

8) DECANT EXCESS H_2O OFF TOP INTO SEPARATE CONTAINER

9) MIX GLAZE & TEST VISCOSITY

10) THIN OUT WITH H_2O (STEP 8)

LABEL TEST TILE WITH RED IRON OXIDE (R.I.O.)



Δ04 = TEMP
100 = TEST NUMBER

* IF NEW RECIPE, ADD TO TEST RECIPE BINDER.

LOW FIRE
1945°F

Δ04 Clear Glaze

5500 Gerstley Borate
1500 Silica
3000 EPK

Δ04 Majolica

6572 Frit 3124
1722 Soda Feldspar
1082 EPK
624 Nepheline Syenite
500 Tin Oxide
1000 Zircopax
200 Bentonite

(2 teaspoon EPSOM SALT per 5 gallon)

Δ04 Semi-Matte

800 Silica
700 Gerstley Borate
160 Lithium Carbonate
100 Nepheline Syenite
140 EPK
100 Tin Oxide
2 Magma (or CMC, Bentonite ,etc.)

Δ04 Anne Currier Matte

200 Gerstley Borate
100 Cryolite
150 Spodumene
300 Lithium Carbonate
250 Zircopax
2 Magma (or CMC, Bentonite, etc.)

Δ04 Peel / Crackle

120 Gerstley Borate
92 Magnesium Carbonate
20 Lithium Carbonate
40 EPK

Δ04 Lichens

100 Magnesium Carbonate
100 Borax
20 EPK
60 Gerstley Borate

Δ04 Bead

53.4 Borax
66.6 Gerstley Borate
66.6 Magnesium Carbonate
13.4 Silica
13.4 Zircopax

Δ04 Turquoise Semi-Matte

800 Silica
700 Gerstley Borate
160 Lithium Carbonate
100 Nepheline Syenite
140 EPK
100 Tin Oxide
60 Copper Carboate
2 Magma (or CMC, Bentonite ,etc.)

Δ04

Δ04

Δ10R Mamo Yellow

5000 Custer
2500 EPK
2000 Dolomite
500 Whiting
100 RIO
600 Rutile

Δ10R Spotted Shino

4000 Nepheline Syenite
3000 Spodumene
1700 Ball Clay
800 Soda Ash
500 EPK
200 Bentonite

Δ10R Reitz Green

6900 Nepheline Syenite
1500 Petalite
200 Gerstley Borate
600 Whiting
800 EPK
100 Cobalt Carbonate
200 Rutile

Δ10R Mottled Tomato Red

4350 Custer Feldspar
2100 Silica
600 EPK
600 Talc
750 Whiting
1000 Bone Ash
1050 RIO

Δ10R Mottled Blue

4260 Soda Feldspar
2660 Silica
1160 Dolomite
890 Gerstley Borate
180 Zinc Oxide
140 EPK
440 Barium Carbonate
500 Rutile
50 Copper Carbonate

Δ10R Transparent Clear

7200 Cornwall Stone
1800 Whiting
300 Gerstley Borate
300 Bentonite
300 Zinc Oxide
100 RIO

Δ10R Rob's Green

7000 Cornwall Stone
1600 Whiting
900 Barium Carbonate
500 Gerstley Borate
800 Copper Carbonate

Δ10R Fantastic Clear

2800 Custer Feldspar
2000 Grolleg
2600 Silica
1800 Wollastonite
800 Strontium Carbonate

Δ10R Waxy Violet

3850 Custer Feldspar
1250 Talc
1630 Whiting
2900 Bentonite
2900 EPK
2690 Silica
400 Cobalt Carbonate

Δ10R White

1970 Dolomite
260 Whiting
3510 Custer Feldspar
2260 Ball Clay
2000 Silica
1000 Zircopax

Δ10R Oribe

2950 Custer Feldspar
2400 Silica
2100 Whiting
750 Talc
1200 EPK
100 Bone Ash
600 Copper Carbonate
500 Bentonite

Δ10R Hendrix Blue

6350 Custer Feldspar
1950 Whiting
1700 EPK
400 Rutile
75 Cobalt Carbonate
200 Bentonite

Δ10R Waxy Black

4000 Soda Feldspar
2000 Dolomite
2000 EPK
2000 Silica
250 Cobalt Oxide
250 Chromium Oxide
250 Manganese Dioxide
250 RIO

Δ10R Noxema Blue

**runs when thick*

3500 Custer Feldspar
3000 Silica
1500 EPK
2000 Whiting
300 Cobalt Carbonate

Δ10R Speckled Pumpkin

3300 Custer Feldspar
3300 EPK
1670 Dolomite
665 Whiting
330 Tin Oxide
535 Bone Ash
70 RIO
130 Rutile

Δ10R Yellow Salt

6048 Nepheline Syenite
2015 Dolomite
1528 Zircopax
411 Ball Clay
96 RIO
382 Bentonite
15 Epsom Salt

Δ10R Korean Celadon

2500 Custer Feldspar
2500 Whiting
650 EPK
2000 Ball Clay
2000 Silica
200 Yellow Ochre
150 RIO

Δ10R Tenmoku II

4675 Custer Feldspar
1775 Whiting
2335 Silica
230 Zinc Oxide
500 EPK
485 RIO

Δ10R Tenmoku
(Pete's Black)

5000 Custer Feldspar
1500 Whiting
2200 Silica
1100 EPK
200 Zinc Oxide
800 RIO

Δ10R Blizzard *Irvine Chun*

3970 G-200 Feldspar (k)
1660 Whiting
3420 Silica
210 EPK
450 Magnesium Carbonate
60 Bone Ash
230 Zinc Oxide
200 Tin Oxide

Δ10R Carbon Trap Shino

5000 Nepheline Syenite
1960 Custer Feldspar
1660 Ball Clay
1250 Spodumene
290 EPK
330 Soda Ash

Δ10R Carbon Trapping Shino II

4000 Sodium Feldspar
3300 Spodumene
1100 EPK
900 Soda Ash
500 Ball Clay
200 Bentonite

Δ10R Copper Red

7380 Custer Feldspar
1020 Gerstley Borate
1110 Whiting
490 Silica
30 Copper Carbonate
100 Tin Oxide
100 Bentonite
15 Epsom Salt

Δ10R Rhodes Kaki Magic Matte

4910 Custer Feldspar
350 Whiting
2500 EPK
2240 Dolomite
450 Zircopax

variation #1 – add:
200 Copper Carbonate
50 Cobalt Carbonate

Δ10R Green Iridescence

6483 Cornwall Stone
1575 Whiting
438 Gerstley Borate
649 Strontium Carbonate
300 Bentonite
865 Copper Carbonate

Δ10R Green Leather

2500 Custer Feldspar
2500 Dolomite
2650 EPK
2000 Silica
175 Rutile
175 Chrome
175 Cobalt Carbonate

Δ10R White Pebbles

5500 Nepheline Syenite
4500 Magnesium Carbonate

Δ10R Satin Black

2000 Custer Feldspar (potassium)
2000 Kona Feldspar (soda)
2000 Silica
1500 Dolomite
1300 Talc
1000 Ball Clay
200 Whiting
300 Red Iron Oxide (RIO)
300 Cobalt Oxide
200 Manganese Dioxide
100 Chrome Oxide

Δ10R Lavender

3850 Custer Feldspar
1250 Talc
1630 Whiting
2690 Silica
290 EPK
290 Bentonite
400 Cobalt Carbonate

Δ10R Mottled Tan

5340 Custer Feldspar
1010 Dolomite
860 Ball Clay
630 Whiting
540 Zircopax
500 EPK
480 Gerstley Borate
160 Magnesium Carbonate
480 Rutile

NAME _____
Ceramics Level _____

What you should already know from ART 2310
materials and processes knowledge quiz

What is clay?

What is a clay body?

What is the difference between earthenware and stoneware clay?

What is ceramic?

What are the stages of unfired clay?

What is unfired clay called?

What happens if you trap air inside a clay form?

Generally, we should limit the wall thickness to under an inch. Why?

What are 3 ways to help prevent cracking?

What is a Mason stain?

How do you mix a ceramic stain?

When do you apply it?

What are 3 types of slip and their uses?

What stage of clay do you apply slip to the historical pottery project?

What is terra sigillata?

What stage of clay do you apply terra sigillata?

What do we fire our clay artwork in?

What is the first firing called?

What is glaze?

What are the 3 main ingredients in a glaze?

What state of clay is glaze applied?

What happens if you glaze the bottoms of your work?

WSU Ceramics Critique Sheet 9/26

NAME: _____ circle one : Ceramics (II) (III) (IV) (V)

This form is intended to help communicate your progress. Attendance, test scores and other objective grading criteria are not part of this document. This is not a "hard grade" report. It is a progress report reflecting on the first four weeks of class. I will comment and offer a "soft grade" to this point in terms of your artwork, work ethic, experimentation, testing, etc.

Do you feel like you have spent the necessary time working towards a successful semester in ceramics?

Do you feel confident and comfortable in making clay from: Reclaim? _____ Scratch?_____

Do you investigate the email "Week in Review" from Ceramic Arts Daily?

What are your thoughts about it?

What other research have you done for this class?

What are your strengths to this point in regards to your projects and/or research methods?

What are some challenges have you discovered about your projects and/or research methods?

Is there something specific you would like me to work with you on individually?

Anything else you would like to comment on or elaborate further on?

Instructor Response:

WSU Ceramics NAME: _____

CERAMICS II – V

Process Test

What is the chemical formula for clay?

Where does clay come from in nature?

What is primary clay?

Name a primary clay.

What is secondary clay?

What is plasticity in clay?

What are 2 things that determine clay's plasticity?

What is earthenware?

What is stoneware?

What is porcelain?

What is vitrification?

What is refractory?

What is a Eutectic relationship?

WSU Ceramics NAME: _____

What (multi) cone range is the first firing?

Typically what cone is considered:

Low fire

Midrange

High fire

What happens during a firing at the following temperature:

207F

650-950F

1050-1100F

Identify the following recipes as one of each:

1) Earthenware, Stoneware, or Porcelain
2) Throwing or Handbuilding

60 Ball Clay
40 Feldspar
60 Goldart
60 Medium Grog
60 Fire Clay
1 Bentonite

20 Ball Clay
20 Fireclay
50 Redart
10 Silica
5 Talc
5 Nepheline Syenite
5 Spodumene

20 Fireclay
20 Ball Clay
50 Redart
12 Silica
10 Fine Grog
5 Talc
5 Nepheline Syenite

60 Goldart
40 Fire Clay
20 Ball Clay
20 Feldspar
5 Redart

85 Kaolin
50 Feldspar
15 Silica
15 Ball Clay

25 Ball Clay
35 Talc
25 Fire Clay
10 Kaolin
10 Feldspar

WSU Ceramics NAME: _____

What is a pyrometric cone?

Draw and label a basic bisque fire cone pack (names and cone numbers)

What is kiln wash?

How do you properly store kiln shelves? (3 things)

What is the difference between reduction firing and oxidation firing?

Shellac Resist:

What type of clay and why?

What stage of clay and why?

What type of finishing solution and why?

Describe the process.

Majolica:

What type of clay and why?

What stage of clay?

Describe the process.

WSU Ceramics Critique Sheet 10/24

NAME: _____ circle one : Ceramics (II) (III) (IV) (V)

This form is intended to help communicate your progress. Attendance, test scores and other objective grading criteria are not part of this document. This is not a "hard grade" report. It is a progress report reflecting on the first four weeks of class. I will comment and offer a "soft grade" to this point in terms of your artwork, work ethic, experimentation, testing, etc.

Have spent the necessary time working towards a successful semester in ceramics?

Do you feel confident and comfortable in making clay from: Reclaim? _____ Scratch?_____

Do feel confident in mixing a 500g test batch of glaze with labeled test tile?

Do you feel confident in mixing a large Cone 9 (green bucket) 10,000 gram batch of glaze?

Do you feel confident in loading an electric kiln?

Do you feel confident in programming an electric kiln?

Was the Powerpoint on processes useful or helpful? (YES) (NO) and WHY?

Was the Powerpoint on artists working with various slab techniques helpful? (YES) (NO) and WHY?

Was the clay body lecture helpful? (YES) (NO) and WHY?

What other research methods have you conducted since last critique?

What are your strengths to this point in regards to your projects and/or research methods?

What are some challenges have you discovered about your projects and/or research methods?

Is there something specific you would like me to work with you on individually?

Anything else you would like to comment on or elaborate further on?

Instructor Response: