

CERAMIC SCULPTURE

Activities for Elementary Grades K-3

The following activities are for lower elementary grades. They are actual activities taught by members of the Committee to children ages 5-9. Although they are suitable for young children, the activities can be easily adapted to older groups.

Ceramic Art History: “the analytical eye and structure”

Objective: Students will demonstrate an understanding of how to learn from Art History by choosing a “famous” ceramic artist and studying his or her work (at least two or more pieces—more is better), focusing on the formal structure, technical applications, and aesthetic and stylistic nuance of the historical work and creating an original work of ceramic art “IN THE MANNER OF” their chosen famous artist.

Materials: Research and reference materials must be available for students to study. Check out local Museums, Universities, Community Libraries, School Libraries, and personal collections for photographic portfolios of well-known ceramic artists and their work. Video and slide images also work well.

Process: Students will first look through a number of research references until they find a ceramic artist who intrigues them. After focusing on their artist of choice, students will make a list of 10 characteristics they see in the artist’s work. These characteristics should focus on use of visual elements and principles and stylistic approaches to clay as well as on technical devices, kinds of materials, decoration, tools, and firing techniques. Obviously, students will be somewhat limited by the physical facility of their classroom and school. After making their list and checking it twice, students will close the books and do four quick thumbnail sketches of ideas inspired by their selected artist. This is not a copying exercise. (see lesson appendix for a short list of ceramic artists)

Without referring back to the books, students will proceed to work in the manner of their chosen artist, using the best of the four ideas they have sketched and trying to use all 10 of the characteristics they observed in the work of their artist in their own project. Much of ceramic art history does not identify the name of specific artists. Rather it is identified chronologically by culture. This is just fine. Have students focus on a time and culture they are interested in and follow the rest of the project as described. Try: Greek, Japanese, Chinese, Mayan, African, or Native American.

Evaluation and Exhibition: When the students say they are finished, have them look at their project again and find at least one more thing they can do to improve the work. This is a kind of art criticism. Don't ask if the student is finished, but ask if the work is complete. Younger students tend to be finished with a project when they are bored rather than when the project is completed. Students should write a review of the process they just went through including biographical or historical and cultural information, the list of the 10 characteristics, and should apply the critical model the class is using and address the aesthetic question, "Do you like it? Why? This written statement can be exhibited with the work.

Related Projects: Group projects can also be done in this manner with students working together to produce a large work of art (tile mural, life-size sculpture, etc.) or each student can create a work in the manner of the same artist or culture that is being studied by the whole class. The culmination of the project could be a public presentation of their famous artist with work in the manner of that artist, portraits of the artist, biographical facts, maps, dramatic productions, and so forth. A video of this project will make a wonderful teaching aid for next year's students.

Vocabulary: (teach these to the students) Style, nuance, biography, culture, technique, criticism, aesthetics, history.

Bibliography: The Book Of Cups, The Eccentric Teapot, and American Potters, Garth Clark; Art Of The Modern Potter, Tony Birks; Peter Voulkos, Rose Slivka; World Ceramics, Robert J. Charleston; The Terra Cotta Army of Emperor Qin, Caroline Lazo; The Art of Japanese Ceramics, Tsugio Mikami; Clay Today, Contemporary Ceramists and Their Work, Los Angeles County Museum of Art; Studio Pottery, Oliver Watson; Ceramics, A Potters Handbook, Glenn C. Nelson; Ceramics—Mastering The Craft, Richard Zakin; and the past 30 years' issues of Ceramics Monthly magazine.

Ceramic Artists:

Bernard Leach, Shoji Hamada, Hans Coper, Shoji Hamada, Maria Martinez, Lucy Lewis, Marilyn Levine, Peter Voulkos, Rudi Autio, Paul Soldner, Betty Woodman, Rick Hirsch, Robert Sperry, Jim Romberg, Ken Ferguson, Wayne Higby, Arnold Zimmerman, Robert Arneson.

Ceramics: An Historical Perspective

“...if all the rest of his activity were to vanish, man might still be known by his pottery.” Germain Bazin, *The Loom of Art*.

Some questions to promote discussion:

How old is art? What is the oldest art form? How old is ceramics, pottery, sculpture, painting? How old is literacy (written language)? What is the oldest written language we know of? What technology did this first literacy depend on?

How old is the potter's wheel? How was ceramics made before that? How old is kiln technology? How was clay fired before kilns were invented? What is the strongest, most durable material known to man?

Long before the invention of the potter's wheel, which occurred around 3000 B.C., man was forming vessels and sculptures out of clay by hand without the aid of a mechanical device. Of all the remains left by ancient cultures, perhaps none have proved as valuable to the archaeologist and the student of history as the numerous artifacts made of fired clay. Except in unusual and fortuitous circumstances, items of wood, leather, and fabric, however carefully fashioned, that have survived more than a thousand years are rare. Even bronze and iron are prone to disintegrate, and exposed stone weathers nearly as rapidly. Clay, which is usually abundant everywhere, has the unique property of being easily fashioned into a variety of forms. When fired in a kiln or even in a bonfire, it fuses into a hard and durable material.

Ceramics has an extremely long and varied history. Neanderthal hunting and gathering groups who roamed across Eurasia 70,000 to 35,000 years ago had fire and may have made clay vessels hardened in fire, but the first evidence of true carving and artistic use of clay does not appear until the development of homo sapiens about 35,000 years ago during the last Ice Age. A prehistoric drawing found at an excavation site in China leads archaeologists to believe that, at least in this area, twig baskets, mudded with clay to make them hold water or food, were one day put on a fire—with the discovery that the basket burned out, leaving a hardened clay vessel.

In about 30,000 B.C., clay animals and figures emerged, modeled in the round as well as carved in clay walls and floors. Ruins of prehistoric kilns also have been found from this period. It has been discovered that the North American Indians were burning clay pots in bonfires 25,000 years ago; to this day, they do not use kilns. All early cultures that fired clay had knowledge of different clay pigments, of metallic oxides that would resist temperatures of red heat and could be used for decoration, and of methods of hand fabrication and structure.

The almost indestructible nature of fired clay has allowed us to surmise the existence of cultures that otherwise would be completely unknown. Birth, puberty, and death are the great traumatic experiences of human life. Although we, in the twentieth century, tend to be a bit blasé about these events, our ancestors celebrated them with elaborate ritual. Death, in particular, was a frightening and mysterious event that required the propitiation of unknown forces. Belief in some sort of existence in the hereafter dates from the furthest reaches of time, for we find the Paleolithic peoples sprinkled their dead with red ocher as a symbol of life and buried them with their stone weapons and a supply of food. As early peoples developed the skill of pottery making, we find pottery included in these funerary offerings. A large portion of the ancient ceramics that we know about comes from such grave sites and, for the most part, the items were made especially for that purpose. The forms were often those in common use at that time but with a thinner and more carefully finished body and elaborate decoration.

Reflecting the conservative nature of religious customs, the grave ware sometimes also resembles an older style and could, for example, still be hand built although the ware made for daily use was wheel thrown. Often, the grave offerings were overly elaborate and nonfunctional in design and were even decorated with fugitive colors, reflecting their onetime use.

Clay feels soft and pliable in your hands. Pick up a lump of it, let your fingers respond to its **plasticity**, and as you pinch and poke it, the clay seems to have a life of its own to which your fingers respond. Perhaps you will find yourself forming a human figure, an animal, or a small pot.

By responding to the clay's plastic quality with these pinching gestures, you are repeating the actions of untold numbers of members of the human family—your family—who have worked with clay even as far back in time as the Ice Age, 37,000 years ago. The earliest known examples of clay objects formed by human hands are representations of animals modeled on a clay bank in a cave in France and some fired clay animal figures and a female human figure found

at an Ice Age site in what is now Czechoslovakia. Both of these sites are roughly 30,000 years old.

Fragments from clay vessels and objects are the chief remnants left from prehistoric human activities. Ancient peoples are studied mainly through the clay artifacts—or shards thereof—that remain. From the ceramic fragments that have survived, we draw inferences about cross-cultural borrowing, trade, migrations, and the degree of sophistication of different societies. For instance, cultures with potters' wheels were no doubt somewhat industrial and production oriented, whereas handbuilding cultures may have been isolated and more spiritually oriented. Some cultures had trained potters or communities of potters, while in others all members of the community made clay forms, when necessary, for everyday or ceremonial use. Indications of whether potters were only men or only women, whether decorations were elaborate or minimal, and whether high technologies were developed or traditions continued unchanged for thousands of years have been used as clues to the lifestyle of ancient peoples, their political and governmental development, and their degree of communication with other societies. Nearly everything we know about our ancient ancestors is learned from their clay artifacts.

Even in very ancient sites, crude clay pieces appear, including works of unusual aesthetic interest. Throughout the Japanese islands, archaeologists have found earthenware objects of great antiquity and artistic exuberance. Some have been carbon dated as old as 12,000 B.C. This work is referred to as Jomon, which means “cord pattern,” because the early pieces are characterized by overall surface decorations apparently created by pressing cords into the damp clay or incising it with sticks, shells, or tools. Jomon ware was most likely handbuilt by some coiling technique, but the surface has been smoothed and obscured by the texturing, which was often highly elaborated into sophisticated designs.

Although early people were using crude stone tools in East Africa in the early Paleolithic period, as long as 2.6 million years ago, most of human cultural development has occurred much more recently, since the beginning of the Neolithic period after 10,000 B.C. The peoples of the Paleolithic period were wandering hunters. They also gathered wild seeds, tubers, and fruits. At the end of the Paleolithic period, the icecap covering most of northern Europe, Asia, and North America receded, and much of northern Africa and western Asia became hot and dry. During the early Neolithic period, after about 7,000 B.C., early communities began to settle down in fertile and temperate river valleys, first in western Asia and eastern Europe, later in Egypt, India, China, and Mexico.

Here are some historical highlight and milestones in the development of ceramics to look for in your research:

- JAPAN, Jomon pottery, ca. 10,000 B.C.
- neolithic TURKEY, Mother Goddess sculptures, ca. 6,000 B.C.
- CHINA, Northern Yellow River valley, Chambered kiln in which the ware was in a separate compartment from the fire, ca. 5,000 B.C.
- EGYPT, Nile Valley, earliest known glazes, ca. 5,000 B.C.
- EGYPT, first use of Egyptian Paste, a soluble salt-saturated clay that was self-glazing used for jewelry and small sculptures, ca. 5,000 B.C.
- MESOPOTAMIA, work thrown on a “slow wheel”, ca. 4,000 B.C.
- PAKISTAN, Harappa and Mohenjo-doro culture, potters’ wheels set into pit driven by a kicked flywheel, ca. 3,000 B.C.
- CRETE, Minoan culture at Knossos, Naturalistic and stylized drawing with colored engobes on functional vessels, ca. 2,000 B.C.
- CHINA, Shang Dynasty, finely carved white earthenware (not quite a porcelain) vessels with a thin leadless glaze, ca. 2,000 B.C.
- PERSIA, Amlash culture, hollow-built animal and zoomorphic vessels, ca. 2,000 B.C.
- ANATOLIA, Hittite culture, carinated, keel-like clay forms that copied bronze motifs, ca. 1,600 B.C.
- PERU, Chavin culture, highly burnished utilitarian ware and toys and musical instruments, ca 1,200 B.C.
- CHINA, Chou dynasty, first clay fired hot enough to be stoneware and intricate geometric incised decorations generated on a potters wheel in leather-hard clay, ca. 1,100 B.C.
- CHINA, Chou dynasty, first know use of true porcelain, ca. 1,000 B.C.
- GREECE, Attic, geometric period, large vessels decorated with elaborate patterns coated with shiny terra sigillata surface, ca. 800 B.C.
- GREECE, Attic, classical period, realistic human figures painted in black onto red clay, with fine detail lines scratched through the black, ”Black Figure,” ca. 550 B.C.
- GREECE, Attic, classical period, super-realistic human figures painted in red on black background and finely scratched details, skillfully wheel thrown ware, ca. 500 B.C.
- AFRICA, Nok culture, Nigeria, large hollow-built figure of terra-cotta, ca. 500 B.C.
- CHINA, Xian dynasty, thousands of life-size hollow-built warriors and horses, ca. 200 B.C.
- HOHOKAM, southwestern United States, coiled and smoked vessels, ca. 200 A.D.
- KOREA, Silla Dynasty, wood fired, high fire stoneware at cone 10, ca. 400

A.D.

- JAPAN, Haniwa tomb sculptures of figures and animals, large hollow-built, ca. 400 A.D.
- CHINA, T'ang dynasty, camels, horse and riders, courtly figures, hollow-built with lead glazes, ca. 600 A.D.
- PERSIA, Tin opacified white glaze with cobalt blue floral designs on vessels and tiles, ca. 700 A.D.
- MAYAN, Mayan culture, Central America, Jaina tomb figures (delightfully decorated and colored portrait figures of real people, used in the necropolis island of Jaina), ca. 900 A.D.
- MIMBRES, Mimbres culture southwestern United States, ceramic bowls and platters with hole to help release vessel's spirit, white clay with black and red decorations, handbuilt and slip decoration, pit fired, ca. 950 A.D.
- CHINA, Sung dynasty, porcelain with celadon glaze, ca. 1100 A.D.
- EUROPE, Functional wheel thrown ware, early wood and salt fired surfaces, ca. 1250 A.D.
- MEXICO, Aztec culture, Mexico, earthenware hollow-built figures, ca. 1300 A.D.
- CHINA, Ming dynasty, cobalt blue and copper red decorations under clear high fire glaze, ca. 1400 A.D.
- HOLLAND, Delft ware, Delft, Holland, Cobalt over tin-opaque on white earthenware, ca. 1500 A.D.
- SPAIN, Luster ware, Valencia, Spain; copper luster glazes, ca. 1500 A.D.
- JAPAN, Shigaraki ware, Shigaraki village, Japan; stoneware vessels with feldspar eruptions in the clay, wood fired with fly ash glaze, 1500 A.D.
- PERSIA, Majolica decorated, luster glazed, tiles on brick, ca. 1500 A.D.
- FRANCE, Bernard Palissy, "Dream of Polyphilus," polychrome glazes, 1550 A.D.
- JAPAN, Raku-style tea ware, rapid fire and rapid cooling with low-fire glazes, late 1500's A.D., Chojiro, for Sen no Rikyu.
- JAPAN, Imari, Arita, Japan; porcelain, overglaze enamel and gold, ca. 1600 A.D.
- ENGLAND, Slipcast vessels, engobe decoration on red clay, ca. 1700 A.D.
- AMERICA, Early American ceramic industry starts with the use of German style salt-glazed jugs and crocks, ca. early 1700's.
- ENGLAND, Wedgwood, Stoke-on-Trent, England; cobalt-colored porcelain with sprigged (relief applied) designs, ca. 1800 A.D.

Time Line

Objective: Students will demonstrate an understanding of History by creating a time line based on personal research and dealing with the chronological development of ceramic arts and crafts.

Materials: Space to display the time line, which will occupy 18 inches per student, heavy gauge drawing paper, access to library and history books, felt-tipped markers.

Process: After looking at a couple of time lines (either in a text book or at a commercial bulletin board time line) make sure students understand the basic concepts of; 1. chronology and time sequence; 2. graphing the idea onto a time line. Share with students some highlights in ceramic history such as earliest pottery and clay sculpture, earliest written language—cuneiform—written on soft clay tablets, early use of “cone mosaic columns” and tile floors and walls, advent of the potter’s wheel, development in kiln technology, and some cultural highlights in known ceramic-laden cultures like Grecian, Chinese, Japanese, Mayan, Egyptian, Native North American, Incan and African.

Now have students choose a time and a culture for which to research the ceramic tradition and developments. After each student has made a choice (group projects work well also), list them in order on the board to see if there are any significant gaps in the time line. Each student need not bite off a very large piece of time. The learning window is greater if the goal is depth and not just breadth.

Once every student has chosen his or her place on the time line, give the students the time and opportunity to research and develop a one-page presentation, like a handout, on their chosen subject. The page should include dates, illustrations (either student generated or photo copied), technologies, distinctive forms and decorative motifs, functions, innovations, ritual functions, and aesthetic nuance. Each student will be responsible for a specific point in time and a specific culture. The cultures may overlap: Time is funny that way.

Evaluation and Exhibition: After each student project is completed, exhibit the work in a large enough space to see the time relationships. There should be some consistency in the ratio of time to space on the line. This time line may be appropriate to display with an exhibition of student ceramic work. If this is a studio class, each student should create a piece which captures the sense of the work in their chosen historical period. This may or may not be an exact copy.

Some discussion comparing and contrasting the different times and cultures would be appropriate.

Related Projects: A more contemporary time line can be made of famous ceramic artists. The time line could be more in depth if it is limited to one culture or one time frame, like twentieth-century America. An adjacent time line of Art in general may also accompany the ceramic time line.

If you were to ask any group of students, even art students or art teachers, to name a famous artist, chances are the list would include white, male, American and European painters, and little of anyone else. This is tragic because it cuts the very heart and significance out of art. That is, art is for, and about, and within the grasp of everyone, everywhere, at all times. It is a definitive part of the human condition. Human beings can accurately be defined as the only living things we know of that make art, persist in making art and need to make art. Another way to do a ceramic time line is to focus on a specific ceramic artist and the development of his or her style and career.

In ancient times, the names of successful painters were either never known or have been lost to us. The same is still true, to some extent, with ceramic works of art and ceramic artists. This is not true in all cultures, but it is true in ours. Any young Japanese school student will be able to name a famous potter or two, but we are hard pressed to even if we studied art in collage. We get caught up in the pioneer functional paradigm and assume that anything that has a functional or utilitarian tradition must be naive and primitive; after all, our pioneer ancestors made and used ceramic pots. And we are so much better today, more sophisticated and urbane than those poor folks were. That is probably due to this culture's need to distinguish between fine art and craft and to establish some arbitrary and often pompous criteria for what art is and what, by definition, must be excluded regardless of content, technique, significance, and beauty.

A terrific history project can be organized around students researching famous and significant ceramic artists and creating written and visual presentations on each and organizing them chronologically. Here are some names of important artist who focused on clay as their "medium of choice".

Shoji Hamada, Soetsu Yanagi, Raku family and the Ohi family. Maria and Julian Martinez and Rose Gonzales, San Ildefonso, Pueblo; Lucy Lewis & Marie Chino, Acoma; Lela Gutierrez and Sara Tafoya, Santa Clara; Wedgwood, Delft, Martin Brothers; Bernard Leach, Hans Coper, Michael Cardew, Elzbeth Woody, Betty Woodman, Peter Voulkos, Rudy Autio, Paul

Soldner, Ken Ferguson Marilyn Levine, Beatrice Woody, Robert Arneson, Judy Chicago, Pablo Picasso, Paul Gauguin, Roy Lichtenstein, Mary Rogers, Lucie Rie, Daniel Rhodes, Val Cushing, Ruth Duckworth and Robert Sperry.

Obviously, there are many others. Some Utah ceramic artists to research are Von Allen, Joe Bennion, Andy Watson, John Neeley, Joseph Germaine, and Barb and John Shaw.

Vocabulary: style, technique, context, culture, content (meaning), criticism, aesthetics.

Bibliography: American Potters, Garth Clark; World Ceramics, Robert J. Charleston; Ceramics, Glenn C. Nelson; Craft and Art of Clay, Susan Peterson; Hands in Clay, Charlotte F. Speight; Studio Potter, Oliver Watson.

The Natural Origins of Clay—Geology

Ceramics is the art and science of making objects from clay and heating (firing) them until the silica begins to melt, making the finished product one of the most durable materials on earth. After thousands of years of history and technological advancement, the most complex machine ever created by man, the space shuttle, is made of dirt. Rather, the protective skin is made of ceramic tiles. It is the only thing we know about that can withstand the expansion, shrinkage, and heat of blasting through the atmosphere.

There was no clay at the beginning of the earth, but clays have been continuously forming for millions of years as the byproducts from original igneous rock such as granite. As the earth cooled very slowly from its fiery origins, a rocky outer crust hardened, while internal pressures and volcanic eruptions pushed up mountainous areas. Gradually, water vapor formed, and an atmosphere was created. The resulting rains and winds caused erosion, while extremes of heat and freezing temperatures led to expansion and contraction of the earth's surface. These combined forces fractured and crumbled the exposed rock.

The composition of this rock varied greatly from place to place, so the process of erosion had different effects and occurred in different manners over the surface of the earth. For the formation of clay beds, the two most important forces were the melting and movement of the ice cover during the glacial ages and the organic acids released by the decay of vegetation. Physical and chemical actions of wind, rain, erosion, and gasses cause the continuous

decomposition of rock into clay. As long as the earth exists, clay is being formed. Chemically, clay is a hydrous aluminum silicate with the formula $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$. The differences among clays are caused by the original geological process and the position of the deposit.

The earth provides a variety of clays that can be mixed with one another and refined to obtain desired characteristics. Clay has long been a valuable raw material. It offers ample flexibility as well as relative permanence due to its capacity to harden when exposed to heat. Most clay found in the earth is not plastic (malleable) enough to be used in ceramics, and nearly all clay has some impurities. These impurities and variations of the basic formula account for the different characteristics of the numerous clay types.

The three common categories of workable clay bodies are **Earthenware**, **Stoneware**, and **Porcelain**. The term “**clay body**” refers to a composition made of two or more clays and includes non-clay materials such as silica, sand, feldspar, and grog. Clay bodies can be categorized by characteristics of firing temperature, workability, and visual characteristics (color and texture). Firing temperatures range from low-fire bodies such as earthenware and raku bodies (1700-2000° F), stoneware bodies, both mid-range and high fire (2100-2400° F), and also porcelain bodies (2300-2400° F). After firing temperature, the most important consideration is the workability of the clay body. Workability usually refers to the **plasticity** of the clay, that is its ability to be molded and bent into a specific shape and to hold that shape. Along with the working nature of a clay, durability should also be considered. This refers to the strength of the clay while being worked and after firing.

The oldest and most accessible natural clay is **earthenware**. It was commonly used by many ancient cultures. It is easily recognized in the work of Native American potters. Earthenware clays comprise a group of clays that mature at comparatively low temperatures ranging from cone 08 to cone 02. They contain a relatively high percentage of iron oxide which results in a rather fragile and quite porous body when fired. The iron also gives fired earthenware its deep red-brown to orange color. **Terra cotta** is a familiar kind of earthenware popular in tile and sculpture making. Earthenware is a common clay body for children. This is unfortunate because it is difficult to work with because it tends to be less plastic than stoneware and is prone to distort and not hold its shape during construction. It has little or no strength during construction. It is o.k. for flat work like tiles and bas relief.

Stoneware bodies have a wide firing range, are workable, strong, dense, and reliable. They are particularly suited for functional pottery vessels because of

their durability. Because these clays are preferred by wheel throwing potters, it is erroneously assumed they are not as good for children handbuilding. However, stoneware is an excellent clay for beginning students of all ages because it is very forgiving. Stoneware bodies range in color from light ivory and buff to dark reds and deep browns. The texture can range from smooth and sticky to coarse and sandy and can have a very speckled surface texture in high reduction firing. Stoneware bodies are tough and can take abuse in the wet plastic stage as well as during and after firing. Stoneware is generally high fired, but it is very durable at low, bisque temperature (cone 06).

The highest firing category of ceramic clay is **porcelain**. It is characterized by a smooth texture, uniform white color, and the ability to accept fine detail. It is highly prized for its smooth, tight, ethereal whiteness. These clays are relatively nonplastic and fire, between cone 8 and 12, to an extremely hard, vitreous ware. These qualities make porcelain ideal for commercial products shaped mechanically by casting and press molding. Porcelain is the least plastic and hardest to work with during fabrication. It is difficult to work in the plastic state and is also difficult to fire because it is brought to maturity nearly at its softening or melting point. Porcelain bodies crack and deform easily and require time-consuming precautions during building, drying, and throughout the firing process.

Science and Ceramic Clay—an Elementary Testing Guide for Clay

Science and Art. Science can be defined as the observation of nature. Art can be defined as the observation of nature. The difference can be found in the vocabulary. Science uses a quantitative vocabulary such as how much, how heavy, how fast, how long, and how hot to describe natural phenomena. Art uses a qualitative vocabulary such as Do you like it? Why? What does it feel like? What do you want it to mean? to describe the exact same natural phenomena. Here is a quick little project which demonstrates how scientific technologies and processes can work comfortably with the arts.

Objective: Students will demonstrate an understanding of the nature of ceramic clay by collecting prospective specimens of clay from their yard, neighborhood, or the school yard and testing the sample for plasticity and firing temperature to see if it is a usable clay body or just dirt.

Materials: Plastic sandwich bag, kiln.

Process: After showing students a variety of ceramic art works and technical functional ceramic works (like electric light socket isolators, toilets, sinks and bathtubs, fire place inserts, sewer pipes, commercial cookware and dinnerware, hot plates, and floor tiles) show students a variety of clay bodies. Stoneware, earthenware, and porcelain are the three basic categories of ceramic clay. Discuss where clay comes from (see “[Natural Clay Origins](#)”) and how to test the dirt and soil in your neighborhood to see if it is clay.

There are several things a young student can do as a preliminary test for clay. Plasticity: plasticity is the quality of damp clay which allows it to bend without breaking and to then hold its shape. This test involves feeling the moistened clay for elasticity and or response to pressure by squeezing the test soil with the hand to see if the clay holds together. Roll clay in coils and bend them around your finger. If you can make a wrap or two without the clay cracking apart and breaking, then you have passed the plasticity test. Other ways to test for clay is to pinch the sample into thin pieces to see if it holds the shape. Flatten slabs to examine stretchiness, build up the clay to see how it supports weight, and cantilever one piece off another to understand its strength. Observe each clay experiment during drying, noting warping or cracking.

With young students it is an excellent idea to take them on a field trip to the school yard and close vicinity to find usable clay bodies. Go through the damp clay tests, modeling the techniques, label the test sample, and store it in a plastic sandwich bag. After you have modeled the process with the class, assign the students to repeat the process at home and to bring what they find to school. If the material seems to pass these preliminary tests, have students collect enough to fill a sealed plastic sandwich bag.

Bring the test sample to school. Make sure the plastic bag is labeled with a permanent marker. To test the clay, roll a ball about an inch in diameter and then flatten it to about 1/4” thickness. Write the student’s name on the round clay cookie and dry the clay. When the sample is dry, fire the cookie to the test temperature. It is best to place the test piece on a previously fired slab of clay just in case it is a glaze rather than a clay body(it melts at a low temperature). Start by testing for earthenware and fire to cone 06, about 1,830° F. If the fired test vitrifies (melts enough silica to make the piece hard like bisque-fired clay) and holds together so it can hold a glaze, then you have discovered a clay mine in your own backyard. You may want to test the clay at other temperatures. Earthenware, which is a mature clay body at cone 06, will melt and become a glaze at cone 10. Does this open up a whole new series of tests for the inquiring mind? (see glaze testing lesson)

After testing the clay for temperature, try to make something with the clay. Not all clay bodies that hold together in the firing are appropriate for hand-building pottery or sculptures. The only way to test is to try to make something and see how the clay works. Remember to keep the clay walls thin, about 1/4" even in sculpture. This process may be more subjective than the traditional empirical process, but then most scientific discoveries are.

Some adjustments may be needed to make the clay workable. The easiest way to improve an unworkable clay is to throw it away and find a better one. Or the poor quality may be due to impurities. To clean organic debris (this stuff lowers the melting temperature) from the clay sample: first, pick out all the rocks and sticks and leaves or roots. If it still isn't working well, the clay can be soaked into a very liquid slurry about the consistency of thick cream and allowed to settle. The big, non-clay chunks will drop to the bottom of the bucket and the top, thinner, more refined clay slurry can be poured off. Let this slurry dry to a workable consistency and retest.

Evaluation and Exhibition: Now that you have discovered your own clay, name it with a name that describes its color, quality, and where it is from. Use it to make something that you like and mount an exhibition of the work with small signs, explaining the scientific process you went through to create your own three-dimensional art medium.

Related Projects: Try mixing a couple of the clays that tested "o.k." together. The more kinds of clay, the better. This is because clays vary in particle size. Think of filling a square frame with balls of the same size and the subsequent air voids between each ball. Now picture the square filled with balls of different sizes and shaken together to fill the space more efficiently, leaving less air between the particles. By combining several kinds of clay, one generally makes a more plastic and durable working body. The less air between the platelets (particles), the more plastic the clay body.

Try mixing a natural clay body with a commercial clay body. Mix them dry first and then add enough water for the clay to become malleable.

Try using the test clay as a coloring slip. After firing the test clay, the student will have an idea of its fired color. Mix enough water with the unfired clay to make a thin slip (liquid clay). Mix it well and then apply it like a paint to a bisque-fired sculpture or vessel. When refired (like glaze) the fired color of the clay comes through, and since most of the clay dug locally is a terra cotta earthenware of a rich warm orange color, the slip becomes a natural way to decorate ceramic pieces. By the way, this is exactly how Native American

potters got all of those wonderful warm earth tones on their pottery. Some of the clay that students bring in to test will not be clay at all but may have some wonderful colorant minerals which will make a great decorating slip.

Vocabulary: Earthenware, Stoneware, Porcelain, Bisque ware, terra cotta, clay body, plasticity, slip, firing.

Bibliography: The Complete Potters's Companion, Tony Birks; The Potter's Complete Book of Clay and Glazes, James Chappell; The World of Ceramics, an Illustrated History, Robert J. Charleston; Contemporary Pottery Decoration, John Gibson.

The Science of Thermodynamics and Pyrotechnics

Objective: Students will demonstrate an understanding of thermodynamics (how heat works) and chemistry by testing and documenting the melting temperature of various ceramic elements in an effort to find a desirable glaze surface for ceramic ware. Each student will be expected to generate a novel and original "fired on" glaze surface.

Materials: Ceramic kiln or small enameling kiln (preferably with a pyrometer but an accurate "kiln setter" will do), clay (stoneware), various chemicals and elements commonly used in ceramics and the production of glazes, note book or log to record tests, pyrometric cones.

Process: Students will first build testing cups. These can be shallow indentations in a slab of clay (1-1/2" to 2" in diameter and about 1/2" to 1" deep) set up in a series like a small muffin pan, or use individual cups made of stoneware clay with about the same dimensions as the indentations mentioned above. These test cups should include a numbering system for identification and should be bisque fired to cone 06 (1,830° F). There are a variety of tests that can be made of a number of elements and chemicals. The first determination to be made is temperature. Some generic temperature groupings that should be considered are cone 012, cone 06, cone 5, and cone 9 or 10. See the [pyrometric cone and temperature chart](#) for more specific information and other options. These four temperatures are designed to give a cross section of traditional firing ranges and categories; very low fire, low fire, medium fire, and high fire. Test at the temperature at which the class product is generally fired. Most elementary programs fire to cone 06 and that is an excellent testing range.

The next decision is to choose a variety of materials to be tested. These can be traditional ceramic materials such as Kaolin, Ball Clay, Feldspar, Soda Ash, Silica, Colemanite (Gerstley Borate), Borax, wood ash, volcanic ash or any found element the student wishes to test such as sand, leaf debris, bone, garden soil, or natural clay from your neighborhood—anything that one wishes to test. The important thing here is to keep careful notes as to the source of these materials, and label everything, so they can be found and used again if desired. The worst scenario is to find a natural low-fire clay deposit which makes a beautiful glaze during the test but cannot be duplicated because the students cannot find it again. Keep careful notes! Remember: we want to demonstrate how science can positively impact the arts so we are using the *Empirical Method*.

After temperature and material decisions have been made, the test materials should be weighed and put into the test cups. It is a good idea to have weights or quantities consistent among test materials, if possible. If appropriate scales are not available, the test can be done by volume, such as teaspoons or half-teaspoon measurements. Again: Careful Notes should be taken identifying which material is in which test cup, and all test cups should be numbered with something that won't burn off in the kiln like underglaze pencils or a red iron oxide wash. The testing process cannot produce any usable information if the notes are inaccurate and the tests are not identifiable or reproducible. The test cups should be put in a kiln with pyrometric cones placed about inside the kiln to make sure the temperature is even and predictable throughout the kiln. The pyrometric cone test is a good idea periodically to make sure your kiln is firing evenly. The kiln should then be fired to the desired temperature and cooled normally. When the test results are analyzed, careful descriptive notes should be taken. Remember: this is Science! Some things to look for are, did the material melt? not melt at all? start to melt? sluff a little? congeal without melting? or melt into a liquid slurry? or boil away? Look carefully at the material and determine the visual quality of the test by determining opacity (opaque to transparent), surface texture (matte to gloss), and color.

After the first test results are recorded and analyzed, students should know something about melting temperatures and the visual qualities of specific materials. Now experimental decisions should be made. Students may want to make the identical test again at a different temperature and compare results. Students may want to combine materials (50/50 blend test) to see what effect these combinations have on melting temperature and visual description. Another possible test is the addition of mineral colorants ([see colorant chart](#)). Various metallic carbonates and oxides can be added to the base material to

change the visual characteristics of the melted test. For example: Cobalt Carbonate will produce a blue in nearly all tests, Copper Carbonate will produce olive green, turquoise, or reds depending on firing conditions and base materials used, Red Iron Oxide will produce greens, blues, yellows, tans, and brick reds, and commercial ceramic stains like Mason Stains are available in a wide palette of color options. All of these materials can be acquired at any ceramic supply outlet and most art supply stores or by ordered from a number of ceramic and art supply mail order catalogs. Continued testing can take place to make sure the glaze dose not melt and run off of the vertical wall of a vessel. To do this, the test material must be mixed with water and applied like a glaze. Adjustments can be made to fine tune the character and quality of the glaze until the student is satisfied.

If the students are having difficulty finding materials that will melt at cone 06, have them mix various amounts of a low-temperature flux into the test. The most readily available one is “Twenty Mule Team Borax” or “Boraxo” hand soap. These are both relatively pure sources for borax, an excellent low-temperature flux. Other low-fire fluxes include Soda Ash, Wood Ash, Colemanite (Gerstley Borate) and Lead. Avoid lead. A flux is a chemical agent which will lower the melting range of the chemicals with which it is mixed. If the test is melting too much, then a refractor element can be added. A refractory is a chemical which raises the melting temperature. The most accessible refractory is a stoneware clay, not earthenware. This can be made by grinding your class clay body or purchasing a dry powdered kaolin or ball clay. Other refractory elements are feldspars and, at low temperatures, silica. Think of these mixtures as a balancing teeter-totter with the flux on one end and the refractory on the other end, and the base material in the middle: the goal is balance at the desired temperature.

Evaluation and Exhibition: After each student has generated a glaze surface, a description of the glaze and a title should be created. The title of the glaze is a way for students to express ownership of their work. The glaze should be applied to the surface of a bisque-fired ceramic piece. This piece can be a vessel or sculpture if the focus is art. This process also can be done on a commercial plain bisque-fired tile, which can be purchased at any tile store. The commercial tile helps this be a chemistry project, but even in chemistry and science, aesthetics play an important roll. The original glaze should then be fired onto the tile and exhibited with the title of the glaze and a brief description of the testing process as recorded in the test log. These can be exhibited to the school population under the title of THERMODYNAMICS

AND PYROTECHNICS. The test results also can be exhibited in the classroom as a glaze description chart and reference for future tests.

Related Projects: Line blend, tri-axle blend, base and colorant tests, and random testing of glaze formulas and clay tests.

Vocabulary: Glaze, thermodynamics, pyrotechnics, opacity, translucency, kiln, firing, cone, pyrometric, pyrometer, flux, and refractory.

Bibliography: Glen Nelson, Ceramics, A Potters Handbook; Robin Hoper, The Ceramic Spectrum; John Conrad, Contemporary Ceramic Techniques; James Chappell, The Potters Complete Book of Clay and Glazes; Susan Peterson, The Craft and Art of Clay.

Ceramic Supply Sources: Interstate Ceramic, Orem, Utah. Capital Ceramics, Salt Lake City, Utah. Westwood Clay Co., California. Aardvark Clay Co., Santa Anna, California. A.R.T., and of course all the art supply catalogs; Dick Blick, Sax, Nasco, and Pyramid Art.

The Pinch Pot

Objective: Students will demonstrate an understanding of ceramic pottery making by designing and constructing a hand-built ceramic vessel using the “pinch” method.

Materials: Ceramic clay (preferably stoneware, but earthenware will do), any appropriate clay modeling and decorating tools, glaze, paint or marker pens for decoration, paper and pencil for planning.

Process: A short introduction into the nature of ceramic clay as opposed to salt dough, oil base clay, play dough and other new polymer sculpture medium such as sculpey, wet set and fimo is appropriate. Some discussion of the tradition of ceramic art is appropriate. Show the slides in this packet. Ceramic art can be divided into three general categories; vessel, sculpture and bricks or tiles. Ceramic vessels are called pottery. The sculptural tradition is based the anthropomorphic figures. The delineation between these two generic groups is blurred and indistinct and probably not as important as many historians and critics who never engaged in the making of ceramic art might think. A third and often overlooked tradition in ceramics is the lowly brick. This category would include construction bricks, paving bricks, flat glazed and painted tiles and relief tiles.

Here we will pursue the vessel.

To make the basic pinch pot bowl form, one must start with a round ball of ceramic clay. The best way for students to make this ball is to compress a small piece of clay, about the size of the negative space left in the hands when they are cupped together. By compressing the clay into a ball, the particles of clay are pushed together, and the clay becomes more plastic.

After the ball is made [the rounder and more symmetrical the ball the rounder and more symmetrical the bowl will be, but symmetry is only one solution], students should hold the ball between thumb on top and fingers on the bottom, while the other hand slowly turns the ball with the thumb in a stationary position on the top of the ball. As the ball is turned, press down gently with the fat pad of the thumb to slowly compress a shallow bowl shape into the ball. When the shallow bowl-shaped divot is about a half inch deep, both thumbs can be used inside the shallow form. Depending on the overall shape desired, the thumbs can be used in a parallel, side by side or juxtaposed position, pointing directly at each other, thumbnail to thumbnail.

At this point, the bowl form should be visible. The two thumb process should be continued until the wall of the bowl is about 1/4" (pinky) thick. The student may want to stop when the walls of the bowl are about 1" thick and add incised or stamped or applied decorations. When the decoration is applied, continue to stretch out the wall to 1/4" or thinner. The stretching of the decoration motif will give it an organic and weathered effect, which gives all the decorations a unified look and makes them less arbitrary.

The blank (unfinished bowl) should **not** be placed on the table bottom down during the working process unless the student wants a flat-bottomed bowl. If the form has a flat bottom, it is also very difficult or impossible to attach the foot. To set the clay down while under construction, place it upside down on its lip. The bowl should be kept off the table while working it. Do not set it down to pinch it out. Keep it in the hands. One's hands are somewhere around 98 degrees, which is very warm. The clay will dry out quickly at that temperature, so work rapidly and deliberately. If you are not sure what to do, then stop doing it. Do not hold and turn the clay while trying to figure it out. When the clay dries out, it loses its plastic nature and starts to tear and crack. An occasional spritz of water from a spray bottle is a good idea. Too much water makes the clay soft and soggy and unmanageable, so spray only when the clay demands it, not when you are bored and looking for something like a spray bottle to play with.

Now that the bowl form is basically completed, it is time to work on the foot. There are four basic ideas available for the foot: 1, the flat bottom; 2, the foot

rim; 3, the tripod; 4, the stem. (see [illustrations](#)). Remember: when attaching two pieces of clay together, you must use slip (liquid clay) as an adhesive, or the pieces will come apart during the shrinking caused by drying and firing. For very young students, a small container with about 1/2" of water is sufficient. Have students dip their finger tip into the water and then rub gently on the edge of the clay to be "glued," until a light layer of liquid clay is raised. The children call it "milk shake." After the project is finished, set it aside to dry. If the foot is too soft to support the weight, let it set upside down until stiff enough to support itself.

After the foot has been attached, let the bowl dry slowly. Quick drying promotes the cracking off of attached elements. When the work is bone dry, load into a kiln and fire to the traditional bisque (biscuit) temperature, 1,830° F or cone 06. After the bisque firing, it is time to glaze and decorate. The obvious solution in ceramics is glazing. This can be done easily and inexpensively with commercial low-fire glazes. These are available through most school districts. The glazes should be applied carefully and completely by dabbing the tip of the brush rather than stroking. Glaze should not be confused with paint and cannot effectively be applied as a paint might be. Read the instructions on the bottles carefully. Usually the glaze must be applied in 2 or 3 coats, letting the glaze dry completely between coats. When the glaze is applied, it is time to fire the kiln again. Read the label of the glaze for the firing temperature. It usually will be the same as the bisque temperature of 1,830° F or cone 06. Cool the fired ware slowly to avoid crazing and fracturing of the glaze surface.

Evaluation and Exhibition: For evaluation purposes, have students title their bowls and write a short description. Students can address this question, "When I look at this bowl I see. . .". An option here is to have students write a fantasy short story about the bowl and its origins. (see [the story of "Seppo"](#)) Mount artist's name and title tags (students can make their own) along with the written description of the work.

Related Projects: Coils and slabs of clay can be added to the basic hemispherical bowl to make a much deeper bowl or a taller bottle form. The pinch pot bowl makes a good foundation base to build other ideas upon.

Japanese Tea Bowls: This project is done the same as the generic pinch pot. This lesson focuses on the aesthetics of a specific cultural nuance, the Japanese Tea Bowl. After showing students examples of Japanese tea bowls, have students first determine if this is a winter bowl or a summer bowl.

(see [illustrations](#)) This is a good opportunity for younger students to learn a little perspective drawing by learning to draw the elliptical opening in a bowl form and by drawing the horizon line edge of the table so their bowl drawing isn't floating in space. The horizon line gives the bowl a place to be.

After the basic bowl is drawn, decorations can be added to the drawing. A space on the drawing should be left for students to name their tea bowl after they make it. After the bowl is constructed, students can add the foot rim (flat bottom, foot rim, stem, or tripod) and the work can be dried and fired. Glaze decoration can be added. Make sure to use nontoxic, food-safe glazes. When the project is complete, students should name their bowl and be encouraged to write a short story about their bowl. The planning drawing, the bowl and the story should be exhibited together.

For closure on this Japanese project, a modified tea ceremony can be conducted on the classroom floor. Japanese don't traditionally sit on chairs. Herb tea like camomile or rose hips or even *Kool Aid* can be used. There is a great body of literature on the Japanese tea ceremony available. A geography lesson on Japan and some social studies lessons on culture are very appropriate. Some Japanese words to teach are: konichiwa, hello; arigoto, thank you; sayonara, good bye. Remember that aesthetics is primarily culturally based and should be included in all art lessons.

JAPANESE TEA BOWLS

In Japan, it is very cold in the Winter and very hot in the Summer.

FOOTING DEVICES:

Foot Rim: The foot rim is made by rolling out a short coil of clay about 2” long. Flatten the coil to about 1/4” thick, looping it into a ring, smoothing the join, and scoring and slipping it to the bottom of the bowl.

Tripod: Three little sausage shapes should be rolled out—all about the same size. Tap the ends on the table to flatten them and score and slip attach to the bottom of the bowl.

Stem: A cone shape should be rolled out and flattened at each end. Insert finger into the bottom of the cone and manipulate the cone into the desired stem shape and attach by scoring and slipping.

Caution: if the clay is too soft, it will not support the weight of the bowl. Dry the piece upside down until the clay sets enough to support the weight of the bowl, turn over, and tap the bottom of the foot on the table to make sure the vessel sits upright and flat on the table.

Greek Kantharos, Kylix, and Styphos: Another variation of this lesson can focus on the Greek and Etruscan tradition in ceramic vessel making. The Greek tradition in clay is ancient and honorable and the obvious well spring for most of what we think of as the European or the American tradition (not to be confused with the Native American tradition). This tradition is a little more complex. Students should start by looking at a number of images of Grecian-style pottery. Since this is a very big idea, focus in on drinking vessels. The three basic drinking vessel forms are Kantharos, Kylix, and Skyphos. (See illustrations, below)

Kylix

Kantharos

Skyphos

Students should choose one of these forms and then choose Bucchero (solid black), Red Figure on black background or Black Figure on red background. These are the three basic ceramic decorative color styles. Students should also be exposed to some of the wonderful geometric decorative motifs available in Greek and Etruscan culture. All of their design should be planned and drawn before they start to make it in clay. (See books such as Ancient Greece, an Eyewitness Book, for reference.)

After the vessel is made using the pinch bowl technique, then foot stems and handles can be added. After drying and firing, students should paint with **Ceramic** watercolor the designs they have chosen. The Greeks did not use glazes as we understand them. They used colored earthenware slips and through a very complex firing technique made some of the slip turn black and some of the slip keep its orange-red color. Rather than trying to duplicate these complex wood firings, have students first draw their decorations and designs on the vessel and then paint with water color or acrylic paint the design pattern. Water color is desirable because each student can mix her own version of the terra cotta red to be offset by the black. After watercolor is applied, the ware can be sprayed with a clear ceramic sealer or a cheaper clear polyurethane spray. These sprays come in gloss to matte finishes, your choice.

Remember that the ancient Greeks used a very restricted color pallet. It is true that after the slips were painted on and fired, that occasionally (this technique fell in and out of favor over a very long period of time) other non-

fired painted colors were added as highlights. The problem of course with this is that the paint wore off with use.

The work can be exhibited with the original drawings and water color and a short critique. A *Kool-aid* party is one appropriate way to process this project. These vessels were all primarily used for drinking wine. Before the project is rejected off hand because of the wine, remember that wine in the Greek and Etruscan tradition was a way to store the grape crop from year to year, and the drinking water in these large metropolitan cities was horribly polluted. The wine was mixed with water to flavor its sewer-tainted bouquet and to kill some of the micro-critters swimming in the water. Alcohol in the wine helped sanitize the drink. It is something like “Biblical Wine.” The point in having students drink out of these vessels is not to encourage children to abuse alcohol but to demonstrate the utilitarian elements of function in pottery and how different cultures developed different solutions for the same problems.

Native American Pottery: A third way to use the blank pinch bowl form is to use it as a means to understand something about Native American pottery. The Native Americans of the Southwestern United States and Northern Mexico had a long and lively pottery tradition as do their descendants today. Students should be exposed to several aesthetic traditions in pottery design.

Some contemporary artists to look for are: Maria and Julian Martinez, San Ildefonso, Pueblo; Lucy Lewis, Acoma and Lucy McGilvey, Navaho/Hopi. Here is a list of interesting Southwest cultures for which information is easily available: **Mogollon** (Mug-ee-on), ca. 300 B. C.-1450 A.D., brown clay with reddish brown geometric decorations; **Anasazi** (Navaho for “Enemy Ancestors”), ca. 500-1300 A.D., gray clay body with black geometric designs; **Hohokam**, ca. 300 B.C.-1450 A.D., buff colored clay body with brick red geometric designs with an affinity for spirals and fine parallel lines; **Hopi**, ca. 1300-Present, modern Hopi is distinguished by light buff to white clay body with reddish brown, orange brown and dark brown (sometimes black) designs that are primarily pictographic and geometric; **Casas Grandes**, ca. 700-1500 A.D., primarily a deep reddish orange clay with black geometric pattern designs; **San Ildefonso Pueblo**, like the Hopi they are remnants of the Anasazi culture who settled their village about 1300 A.D. and are still there.

In this century, the Pueblo’s preeminent potter was Maria Martinez and her husband, Julian Martinez, who did the decorating. Their ware is distinctive because it is black polished clay with flat black geometric and pictographic

designs. For children to reproduce, paint the white body flat dark gray and make the negative space around the design jet shiny black leaving the designs grayish black. There are many other interesting styles of pottery in the Southwest with interesting decorative nuance. Try: Zuni, Taos, Santo Domingo, Santa Clara, San Juan, Navajo, Mojave, Laguna, Pima and Maricopa.

Students should choose one of these cultural styles and do some research. After researching their culture students should draw the bowl with the designs on it. Several ideas should be used so students can pick the “best” one. The designs do not have to be accurate copies of the artifact designs but simply “in the manner” of that culture.

Rather than trying to find all the right colored clays, have students stain the white stoneware clay body with a thin solution of tempera paint. If you don't use white clay then you won't be able to choose the culture that used a white clay background. Tempera comes in what is called “multi-cultural” colors. These are shades and tones of browns and red browns with sepias, umbers, and siennas. This can be applied evenly by dipping into a large bowl of very thinned down paint. Repeated dipping and drying will give a deep and more intense tone of the color. It can also be painted on by hand with a brush but that usually leaves a lot of brush marks unless the student is particularly attentive and patient.

After the appropriate body color has been achieved, draw lightly with pencil (it is erasable) the design motif on the clay bowl form. Use prismacolor felt tipped pens which come in a wonderful variety of earth tones and are permanent. Caution! the tempera paint will rub off a bit if students aren't careful. After the designs are drawn and colored in, spray the whole thing down with a polyurethane sealer. You can actually eat out of it after that.

Exhibit the work with name and title cards and short write ups about specific culture that each student has chosen. Some students may like to work in groups of several students looking at the same cultural nuance. This is a great idea as long as each student comes up with their own design motif. A map showing the geography of the South West and the specific areas of each culture and even a time line of some sort and short didactic explanations of the cultures involved is also a good learning aid.

Vocabulary: vessel, pottery, sculpture, symmetrical, slip, bone dry, cone, glaze.

Bibliography: Southwestern Pottery, Anasazi to Zuni, Allan Hayes and John Blom; The Etruscans, Legacy of a Lost Civilization, BYU Museum of Art; The World of Japanese Ceramics, Herbert H. Sanders; The Japanese Pottery Handbook, Penny Simpson, Lucy Kitto and Kanji Sodeoka.

SPIRIT MASKS

The greater world of art, as found in all cultures and throughout time, is full of animism, the belief that all things have spirit; and therefore, a kind of life and a profound spiritual content. Some philosophies actually believe that everything was created spiritually before it was created physically. Here is a simple ceramic sculpture lesson which focuses on the “spiritual” nature of things available in the study of art. Spirit does not necessarily connote religion.

Objective: Students will demonstrate an understanding of what it means to put a spiritual quality into a work of art by designing and creating a ceramic sculpture mask which reflects and embodies the spiritual essence of some natural phenomenon. For example: the spirit of winter, the spirit of fire, the spirit of food, the spirit of trees, the spirit of my house, family, town, or the spirit of learning, the spirit of happiness and the spirit of friendship. The range is unlimited!

Materials: Ceramic clay (preferably a plastic stoneware suitable for sculpting, but earthenware will do), Ceramic tools (texture tools, fettling knife, wooden drawing tools like shish kabob skewers or pickup sticks or tooth picks or sharpened drawing pencils, pens, and dissecting needles), water, ware board, plastic bags, spray bottle, kiln, glaze or other paintable surface-coloring medium like tempera paint, watercolor, or acrylic paint, any material which can be glued or tied to the finished mask as color or texture or decoration, (beads, feathers, colored rice, ribbon, string for hanging things from).

Process: Students will first be exposed to the ancient and honorable tradition found throughout the world in mask making and the ceremonial uses for masks. Some of the cultures that are easy to find are: Native American, Eskimo, Meso- and South American (Mayan, Aztec, Incan), African (Zulu, Benin, Nok, Ife, Ashanti, Dogon, Bayaka, Kukuyu), Japanese (Kabuki and No), Chinese, ancient Etruscan and Greek drama, Papua New Guinea (mud masks), and Polynesian (ritual masks and war helmets).

To make this idea less foreign, discuss how we still use masks in our culture to represent ideas, feelings and other intangible experiences. [Halloween, bridal veils, wigs and hair pieces, cosmetic surgery, masquerade ball, beards and moustaches or clean shaven, dramatic productions, disguises, make up and hair dye]. How do we use these decorative processes on our own faces, and what is the greater ceremonial and cultural nuance being expressed? Why do we wear masks on Halloween? Where does this tradition come from? It might be helpful to discuss the influence of African masks on the work of 20th-century artists like Picasso, Modigliani, and Miro. Spend some time discussing what the spiritual sense of a thing might be.

Please make sure students understand that when we speak about spiritual things we are not discussing religion in any traditional or sectarian way. Spirit can be defined as the intangible essence, sense, inclination, significance, attitude, feeling, emotion, ardor, or humor of a corporeal or incorporeal thing, the impetus to animation, the special quality that a thing may have which distinguishes it from all other things. What do we mean when we say, “In the *spirit* of peace” or “in the *spirit* of revenge”? or the “*spirit* of Christmas”? Once the idea of a spiritual sense is discussed, ask students to name specific colors, textures, shapes, and lines that reflect and convey a specific spirit of something like *love* or *the desert* or *water*. Ask: What color is the spirit of anger? What shape is the spirit of the wind? What textures would you use to communicate the spirit of money? greed? wealth? or the spirit of ART? It is important to say that there are no right or wrong answers, especially if you ask for an opinion by asking, “what do **you** think the. . . is?”

After the students can discuss to some comfortable degree the important postmodern ideas of spiritual values and content in art, have them list several spiritual things like natural phenomena or personal emotions they may want to interpret in a mask motif using clay. After a list of interesting spirits is made, have students do at least four quick sketches of these ideas on newsprint. Each student should choose the spirit mask idea they like the best and should draw it again with color on a piece of good drawing paper. Have them draw actual size if possible, including color, value, and texture.

When the choice has been made and discussed and the drawing (plan) is completed, have students roll or pat out a slab of clay large enough to make the mask and about 1/4” thick. Students should then draw the outline of the mask very lightly on the surface of the clay. If one draws too deeply in the clay, it will promote a crack during drying and firing. Using a good fettling knife (an old butter knife will do) have students cut the outside shape carefully. After the mask shape is liberated from the clay slab, have students draw again lightly the

details of the mask including eye holes and mouth and any decorations which students want to add.

There are three generic ways to compose and decorate in wet clay:

1. ADD clay to clay. Facial features, costume and decorations can be made out of clay and added to the basic mask shape by scoring and slipping.
2. SUBTRACT clay from clay. The mask shape can be carved into or cut through to create spaces for eyes, mouth, and other decorative shapes.
3. INCISE by drawing and stamping. The damp, flat mask shape can be drawn on or textured with a drawing tool or any textured device which can be pressed into the clay. ([See the stamp and roller lesson](#))

Remember: To attach two damp pieces of clay together, a clay slip (liquid clay) must be used as a glue. For older students, demonstrate the process of scoring and slipping, which is to raise a texture in the edge of clay to be attached by scratching with a dissecting needle and then applying the slip until all the scratches are filled; repeat this process on the other piece of clay to be attached; work the pieces together until they stick; and be sure to dry slowly. For younger children, let them use plain water on the tip of the finger and have students rub the water on the area of the clay to be attached until a thin layer of slip (liquid clay) is visible. The water will not work by itself. When the clay dries, the water is gone, and the clay pieces fall apart. It must be worked into a slip consistency. One good approach is to call the slip “milkshake” and have students hold up their finger to show the “milkshake.”

If a flat mask is desired, then let the project slowly dry on the ware board (wooden or masonite pallet to carry the damp clay project around on or for storage without deforming or damaging the clay). Remember to put a paper resist under the work. Clay will shrink about 5 percent in the drying, and if it cannot release from the ware board, it will definitely crack while drying. If the student wants the mask to have a rounded raised contour which might appear to fit on a human face, this can be done easily by putting a wadded piece of paper towel under the middle of the mask shape to raise up the center of the still malleable clay mask face. The larger the paper wad, the rounder the face contour. These ceramic masks are not designed or intended to be worn, they are art projects designed to be looked at and to communicate ideas.

After the clay project is completed, it should be given a couple of days to dry. This need, of course, necessitates some storage area in the class room. Think about movable carts with shelves. If the project is going to take more than one work period, have students bring plastic shopping bags from home and securely

wrap the work on the ware board in the plastic. Label the bag with a permanent marker. Make sure the plastic bag is twisted closed and sealed. Young students tend to think that if the plastic is close to the clay that is good enough.

After the work has been dried and fired to cone 06 (about 1,830°F), it is ready to be painted or glazed or both and have any other decorative elements glued on. If the student chooses to both glaze and paint, remember the glaze must be fired before the paint is applied. Paint will burn off in the kiln.

Glazing: Commercial low-fire glazes are the easiest and most accessible way to go with glaze. Here are a few hints and cues that should accompany glazing instruction: first, one does not paint on a glaze, one paints paint and glazes glaze. This may seem picky, but the mind set necessary to be successful in each of these venues is so different from each other that they become antithetical. A glaze is a mixture of chemicals in a water suspension which has a specific melting temperature and does not achieve its color or texture or opacity until it is fired to a maturation temperature. Therefore, the artist cannot see what the glaze looks like while the work is in progress. For example, most low-fire green glazes use red iron oxide as the colorant to get green, but at room temperature before firing, it is a reddish rust brown color.

In addition, you cannot tell how thick the glaze is when applying it by looking at it. The thin coating looks the same as the thick coating, but again, with the iron oxide, green example, a too thin coat will result in a brown or sometimes yellow color while a proper thickness (about 2 or 3 coats) will give the desired green. So, you can see that brushing a glaze is not at all like painting. The technique to apply the glaze is usually written on the glaze container and my differ from glaze to glaze or company to company.

Check the firing temperature carefully. Remember, firing temperatures are calibrated in cones (pyrometric cones) and are not in even increments. For example, the lowest cone is 022 and the temperature increases up to cone 02, 01, (as the number decreases) and then cone 1. The next cone up the scale is cone 2 and then on up to cone 15. But as you can see, cone 022 is much cooler than cone 1 or cone 10 and cone 06 is nearly 500 degrees cooler than cone 6. (See the [pyrometric cone chart](#).) The glaze is not to be stroked onto the clay. It is to be dabbed with the tip of the brush to get glaze into the crevices of the texture and to achieve several layers of application to keep an even coating of glaze. Glaze is not a very good medium for detailed realistic painting of facial features. If a student wants a lot of detail and a lot of colors, have them use a painting medium. Glaze works best when used in a color scheme. Have the student choose a base color for the bulk of the piece and then add a decorative

color if desired and perhaps a little bit of a highlight color, but that should be enough (be flexible). Glaze colors do not mix like paint pigments and two glazes mixed together will create a new chemical combination which may not even be a glaze and often isn't attractive.

Caution: Try to avoid lead based glazes, they are toxic. Commercial glazes will be labeled safe or hazardous. Read the labels carefully. When the glaze is applied, the work must be fired in a kiln to the specific temperature required. Quick glaze firings result in more vital and vibrant variations of the color and surface texture.

Evaluation and Exhibition: After the mask project is glazed and fired, students should do a simple writing project to be exhibited with the finished mask. Some ideas for the writing part of this project are, short story, fantasy fairy tale, poetry, and haiku. Another option for writing is to have students write a critique based on the critical model used in the class room. If there is not a critical model in place, try this one; 1. Who is the artist? 2. What does the art work look like? 3. How was it made? 4. Do you like it? Why?

The mask and the writing and a title card should all be exhibited together. If it seems best to display the masks on the wall, use an epoxy glue to attach a hanging device on the back of the clay mask.

Related Projects: Papier-maché masks, construction paper masks, plaster cloth masks, masks that show feelings, masks that tell a story, and life masks from plaster casts. (See [mask activities](#))

Vocabulary: Spiritual, ceremony, ritual, animism, masquerade, costume.

Bibliography: Masks From Many Cultures, Video, Crystal Video, inc., Arts of the Pacific Islands, Anne D'Allewa; Masks, Metropolitan Museum of Art, Chiefly Feasts: The Art of the Potlatch (postcards), American Museum of Natural History; Mask Art of Mexico, Ruth D. Lechuga and Chloe Sayer; African Masks, The Brooklyn Museum; The Secret Language of the Soul, Jane Hope; The Forgotten People of the Pacific, Philippe Diole.

Stamps and Rollers

Objective: Students will demonstrate an understanding of texture as a visual element of art by making ceramic clay stamps and rollers which emphasize the organization of texture as an element of design.

Materials: This project can be done with any three-dimensional art medium. Wood, plaster, paper, cardboard, salt dough, and CLAY. Before deciding on the material, you may want to ask, “What famous artist used this material as their medium of choice?” Ceramic clay may be the best medium for this project because it is easily accessible, totally malleable and forgiving, and it is a real art supply used by real artists in the real world of art. It also is an introduction to a medium which can be used for greater projects such as pottery and sculpture.

Process: Students will first discuss the nature of texture (rough and smooth), and where it can be found, and how it can be used in art. One of the important ideas about texture is the difference between visual texture (implied) and tactile texture (actual). Drawings and paintings which feel flat and smooth can possess the visual illusion of texture. A good project to better understand the nature of texture is to go on the “Great Texture Hunt” by having students collect as many textures as possible by rubbing the side of a crayon on newsprint over a texture. These textures can later be cut and pasted into visual renderings of designs and landscapes or even portraits.

The stamp and roller process is very simple. Each student is given a small nob of clay and directed to make a texture stamp. The stamping end should remain small, about the size of a dime or nickel. Larger stamps are interesting but not very useful in decorating pottery and relief work. The stamp can be any shape and the texture can be found by pressing into any texture-bearing object (soles of shoes) or by tooling a texture into the end of the stamp with any small tools. The roller is made the same way but is designed to have a small hole through it so a nail can be used as an axle, and the whole thing can be rolled over a piece of damp clay, leaving a textural impression. Once again, the texture design can either be found and pressed or tooled intentionally. Look up Sumerian rolling stamps and cuneiform writing on clay tablets for a historical reference.

Evaluation and Exhibition: After the clay is made and dried, it should be fired to about cone 06 or higher. The tool can then be used to decorate pottery, clay masks, tiles, or relief sculptures. When the finished work has been evaluated(critiqued), it should be exhibited with the students’ generated stamp and roller tool exhibited along side.

Related Projects: Any malleable medium can be used to capture textures. The advantage of ceramic clay is its useful durability after it is fired. Textures also can be rendered with pencils by making textural value scales using crosshatch, stipple, scribble, diagonal lines, or any other textural ways to use drawing tools. Collagraphic printmaking and any form of relief printing are also projects

which focus on the use of texture as a visual element to be organized into a visual statement. Clay slabs can be used as print templates for a print making project. Ceramic stamps can also be used to stamp a monographic symbol into a finished project as a signature.

Vocabulary: Texture, incise, rubbing, collagraph, print and printmaking, relief and relief printing, clay, ceramics, sculpture and cuneiform.

Pottery as a Metaphorical Image—Literacy Skills

Objective: Students will demonstrate an understanding of “metaphor,” “simile,” and “allegory” as literary devices by writing an original piece using clay and pottery vessels as a metaphor for life and the human condition. **Materials:** writing materials; research materials including books, slides, and videos; examples of metaphor and allegory in literature.

Process: Literature is full of uses of pottery to discuss other human traits and experiences. Students should be exposed to the use of pottery images in literature as in John Keats, “Ode to a Grecian Urn,” as well as those in Jeremiah, Homer etc. Some discussion of the nature of metaphor, allegory and simile should also take place. Definitions and examples are appropriate. Students should see examples of a variety of literary devices such as haiku, open verse, prose, or short story and other simple poetic styles as vehicles to discuss pottery in its larger metaphorical sense.

Students should be shown some visual aids about the pottery process to get a deeper idea of why it is used in such a metaphorical way. Some videos that do more than just focus on technique are “A Potters Meal” by Steve Olpin, about Utah potter Joe Bennion from Spring City who says that when one opens the kiln, “Sometimes it’s like Christmas, sometimes it’s like Halloween and sometimes it’s like April Fools’ Day!” and “The Hands of Maria,” about Maria Martinez from San Ildefonso Pueblo in New Mexico, famous for dung firing and her black-on-black ware.

After showing these examples and reading some literary styles to the students, have them create in their own stylistic nuance a short piece of literature that deals with clay, pottery, vessels, potters, potters’ wheels, fire, kiln firing, cracked pots, etc. Remember that pottery is primarily “Promethean,” that is, it is based on the technology of fire. Clay is just “special” dirt until it is fired. All technology can be seen as having its roots in the advent of fire. In fact, all life can be seen as little cellular metabolic fires. The gift of fire to the human race

from Prometheus so enraged the Greek Gods that they had an eagle eat Prometheus' liver every day for the rest of eternity.

The goal here is to focus on an accessible art process which has thousands of years of human involvement and to create some metaphorical allegory of these images in a literary form. This is not a visual art project. It is a literature project; but obviously, it is hard to tell where one stops and the other starts.

Evaluation and Exhibition: Students should read their work to the class and allow the class to ask questions and make suggestions. When this is done, students may want to illustrate and display their work.

Related Projects: For younger students, the simple act of writing about pottery, their own or others, is a wonderful way to learn about the significance of the pottery form and is also a way to incorporate literacy into the art experience. See examples of children's "Poetry About Pottery".

Vocabulary:

Metaphor—the application of a word or phrase to an object or concept it does not literally denote, in order to suggest comparison with another object or concept, as in "A mighty fortress is our God."

Mixed metaphor—the use in the same expression of two or more metaphors that are incongruous or illogical in combination, as in "The president will put the ship of state on its feet."

Simile—a figure of speech in which two unlike things are explicitly compared, as in "she is like a rose."

Allegory—1. a representation of an abstract or spiritual meaning through concrete or material forms; figurative treatment of one subject under the guise of another, 2. a symbolic narrative.

POETRY ABOUT POTTERY

Writing: using pottery vessels as a metaphor for life.

Haiku:

Round and Round and Round

The potters' wheel turns

Where you start is where you end. —Stephanie Mallow, second grade.

Big pots are like people.

If they stay empty they're no good.

You cotta fill ‘em up with stuff so you can use ‘em.—Allay Mondays

God made people ought clay
And people make pottery ought clay
When people get burned up they go to heaven or hell
When pots get burned they get good and hard or they explode!
—Aaron Prestgard, third grade.

***For Primary grade students there are several easy strategies that can be used to encourage them toward poetry that is personal and novel.**

1. Ask a pointed question Have students dictate the answer to the teacher who writes it down. Students will then copy the answer in their own handwriting and organize the words in a visual and schematically interesting (and readable) way. It may be appropriate to use the question as part of the poem; it also may be redundant.

Question: How do you make pottery?

Answer:

First you take some dirt
Then you take some water
Then you mix it all together
And wiggle it and wiggle it around a lot.

Then you play patty cake
And make a ball.

Then you squeeze it
Then you pinch it
Then you pat it
Then you mark it with your name

Then you throw it in the oven
For Mommy and me.
—Julienne Manuel, kindergarten, dictated to Mr. Germaine.

Question: What is clay?

Answer:

It is just a bunch of wet dirt,
But it's not dirty. —Kenny Epton, kindergarten, dictated to Mr. Germaine

2. Use the letters of a word as cues to write a descriptive verse.

- A. Always fun
- R. Really, really, really, fun Cody Brantley
- T. Too much fun first grade

3. Alliteration: First graders have a very difficult time rhyming. Let them make poems using only words with the same first sound.

“A Little Ration”

Little lion Eland lay lightly licking lovely Lindsay's lazy Lilly pad.
Teensy tiny Tory turtle tried to tickle tall Tyler's terrible tiger toy.
Can Candy Campbell cut class corners?
Did Danny Dimple do dirty doggie deeds?
Putting Patty Pancake's pretty potted pansy
On Oldie Oil's other 'owner oval owl.

Each line is written as a group project by a different first grade class.

4. Fill in the blank. Set up a metaphorical sentence with blank phrases or words to be filled in.

Art is like . . . because it

Art is like a **rock in your shoe** because it **feels so good to get it out.**
—Maiden Olsen, second grade

Art is like **a basketball** because **the more you use it the better you get.**
—Rune Gray, third grade

Art is like **a meat loaf** because it **is much better when it is done.**
—Bryan Butler, second grade

Art is like **you** because **I love you.**
—Ashley Flygare, first grade

Art is like **dynamite** because it **is a blast.**
—David Sexy, fifth grade

Art is like **a family reunion** because **it brings people together.**

—Alex Kalish, fifth grade

Art is like **a flower** because **it blooms.**

—Allison Kennel, first grade

CERAMIC HISTORY—AESTHETICS

Tell the class the following story and then ask the discussion questions at the end as an introduction to or as part of an activity or section on ceramics.

“Seppo”

This is the true story of a famous Japanese tea bowl. I saw this bowl in a museum in the ancient Japanese city of Kyoto, and the guide told me this story...

In the early part of the seventeenth century, that is the 1600's, Japan was ruled by powerful and fierce warlords called Daimyo. Each warlord ruled over his own kingdom from a castle-like fortress with an army of samurai warriors. These powerful Daimyo answered to no one except the Great Shogun whose castle was in the city of Edo, now called Tokyo. Law and order was left up to each Daimyo, and sometimes it was just and fair and sometimes it was brutal and ruthless.

During this time, a famous artist potter and tea master by the name of Hon'ami Koetsu worked and made wonderful ceramic vessels, which the rich and famous wanted to use in the important tea ceremony. The Japanese tea ceremony was a significant part of the culture, and it was much more than just drinking tea together. It took years to learn how to do the ceremony correctly, and young boys and girls had to take special lessons to learn to do it well. A person who could perform the ceremony with grace and beauty was very honored among the people.

On the west coast of the Northern island of Hokaido, there was a fierce and powerful warlord king who ruled a very large kingdom. He was very proud of

his collection of fine ceramic bowls and tea pots and elegant vases. Most important to him were the ceramic vessels used in the royal tea ceremonies. The king had one big problem which bothered him very much. Years earlier, his father had somehow lost the most famous tea set in the King's collection. It was a raku tea set made by Hon'ami Koetsu with the most beautiful raku-fired tea bowls. One day, a stranger came to the King and told him that he knew where the famous tea set was. He said it was in the castle of a mighty Daimyo way over on the other side of the island of Hokaido. One must remember that the islands of Japan are very large, hundreds of miles across, and Hokaido is the second largest of all the islands in Japan.

This information upset the King very much because he was somewhat greedy and really wanted the famous tea set for his collection. After all, it had once belonged to his very own father. It was especially famous because it had a secret name. In the Japanese culture, when you gave a thing a name it was considered to be alive and must be treated with special respect after that. To make sure it was the same tea set, the King asked the stranger some questions about the set. He asked how many pieces were in the set. The stranger answered, "eight: a teapot to heat the water, a water caddy to hold water, a tea caddy to hold the dry tea, a tool container to hold the whisk to stir the hot tea, and four raku tea bowls. The King was overjoyed because that was exactly the right number. But many tea sets had that number of containers. The King asked if the tea set had a name. The stranger said it did and whispered the name into the King's ear. This is what he whispered, "**SEPPO!**" And what do you suppose? That was the exact secret name of the King's lost tea set, so he knew the one on the other side of Hokaido must be his, and he had to have it.

After some weeks of worrying and pouting and being upset with everyone all the time, the King decided to gather his army together and march across the island and rescue his tea set. He called together his Generals and told them of his plan and instructed them to call the army together. In those days in Japan, many men were warriors. The warriors were called Samurai, and they were a special class of people who were feared and respected. They were good fighters and obeyed a code of honor called Bushido. It was very strict, and many things had to be done in just the right way.

The Samurai were gathered together, and they all brought their families and their servants and their servants' families. By the time all the warriors were gathered together with all of their own people, the army had over 10,000 people in it. In those days, there were no trains, or airplanes, or cars, or even paved roads. There were no shopping centers or big supermarkets to buy food and clothes from. When the army was on the march they had to carry everything

with them including their food, and cows to milk, and pigs to make bacon and sausage, and chickens and ducks and geese, and grain to feed them, and horses to ride and pull the wagons and carts. They had to carry their houses made of heavy canvas, and all their clothes, and all their furniture, and cooking equipment, and of course, their wives and children, and some even brought along the Grandparents because there was no one left at home to take care of them. So the army gathered itself together, and it was very large, and crowded, and dusty, and especially noisy and smelly.

After several months of organizing, the army started marching over the mountains to the other side of Hokaido. They marched for many weeks, stopping to camp and rest often. Soon the weather began to get cold because they were climbing high into the mountains. It was also starting to turn to winter. First it rained, and the ground got muddy, and the whole camp had to stop for a while. Then it started to snow, and it got too cold to keep marching.

Soon the snow was deep, and it was hard to take care of the animals and all the equipment. The whole camp got bogged down, and the weather got very bad. Some of the people got sick, and some even died in the winter snows. After a few months of this horrible weather, the snow stopped and although it was cold, the army could start marching over the frozen ground. After they crossed over the highest part of the mountain and started down the eastern side, the weather slowly improved. By the time the army got to the foot hills, it was still a little wet, but it was time to stop and get reorganized. The King discovered that over a hundred people had died in the mountains, but that many babies had been born also. The camp rested up and continued their march to the other King's castle.

By late in the spring, the scouts had reached the enemy castle, and one night quietly and carefully the King and his most trusted Samurai soldiers surrounded the enemy castle. It was the largest castle in all of Hokaido and had the largest army and its own water and gardens and animals inside. They were all sleeping. When the sun came up, the soldiers in the castle came to the guard towers on the wall and saw thousands of soldiers surrounding their fortress. Immediately, the King inside ordered his men to charge out of the gates and attack the surrounding army. They did, and a fierce battle took place, but no one won. Each day the armies would meet in the fields around the castle and fight, and each night the army outside would return to the camp, which was actually a small city of tents just over the hill. The other soldiers would return to their houses and families inside the castle walls. Sometimes many warriors would be killed, and sometimes hardly anyone got hurt, but each day the war would continue.

This fighting went on for a very long time. In fact, it went on for years. Winters came, and the war slowed down but didn't stop. Summers came, and the war heated up with the weather. After nearly ten years had passed, there was still no winner, but the people inside the castle were getting very tired. They begged their King to talk to the other King to find out what had caused this war and how they could stop it. The King inside the castle went up to the wall and called to the King outside. After a while, the King outside came up and yelled, "Here am I." The King on the wall shouted, "What do you want? Do you want my gold? You can have it! Do you want my soldiers or my servants or my many animals? Well, you can have them! Do you want my wives or children? You can have them! Just take what you want and go away!"

The King outside was very angry and screamed up to the wall, "I want my father's tea set with the raku bowls, **Seppo!**" The King inside was shocked because he had not known for the whole ten years why they were fighting. Now he knew. He thought for a long time, until in a very low and sad voice he said. "You can have my gold, my soldiers, my servants, my animals even my wives and children, but," and he began to yell, "You will never have my tea set, **Seppo! FIGHT ON!**"

The war continued for three more years. At the end of 13 years, the castle was completely destroyed. The soldiers inside the walls were all killed. So were all the animals. The walls were torn down, and the buildings were burned. The treasures were destroyed. The King and all his servants and wives and children were destroyed. Everything in the castle was gone. The victorious army outside began to search carefully through all the burned and broken rubbish for the tea set. After many weeks of searching, all they could find was the broken pieces of one raku tea bowl. The King ordered his men to build a special box out of the most fragrant sandalwood and scented cedar wood, line it with rare Chinese silk, and put the pieces in the box, and the whole army of many thousands carried it quietly and sadly back across the mountains to their home. Some of the children who were born on the march or during the war had never seen their homeland and were very happy to arrive safe and alive.

After some time, the King called together all of the best artists and craftsmen of his kingdom and told them to figure out a way to repair his tea bowl Seppo. There were no stores to buy glue from. There was no company to make glue to buy. Everything they had was made by themselves or their neighbors. There was nothing strong enough to glue the seven pieces of the broken bowl back together. Finally, an old potter with a very long white beard and a very shiny bald head came forward and said, "I can do it," and he took the broken pieces back to his studio and he fixed it.

Today, if you want to see this bowl, it is in a special room inside a glass case with a security guard in a museum in Kyoto. It is famous in Japan, and boys and girls come from all over to see this bowl and hear the story. When one looks at it, it is easy to see that it has been broken and then patched.

What do you think the old artist used to glue the pieces together? What would be strong enough? Where could he get that kind of glue?

Well! Here is how he did it. He put the broken pieces together and poured melted gold into the cracks. Pure, melted gold! That is what you see today when you look at **Seppo**: pure melted gold oozing out of the cracks.

Use the following questions to discuss the story and its implications:

Do any of you have a bowl in your house? What do you do when it gets broken? Why don't your parents want to fight a war over a bowl? What are your bowls made of? Would you be willing to use pure melted gold to repair one of your bowls? Why or why not? What is different about the old Japanese culture that let people fight a war over a broken bowl? How do the people of Japan feel about raku tea bowls today? Why don't people in the United States have that same attitude toward ceramic vessels?

[\(See the reproduction of the bowl, Seppo\)](#)

Orton Pyrometric Cone and Temperature Chart

Cones:	Temperature: degrees F.
	very low
020	1175
019	1261
018	1323
017	1377
016	1458
015	1479
014	1540
013	1566

	low fire
012	1623
011	1641
010	1641
09	1693
08	1751
07	1803
06	1830
05	1915
04	1940
	medium fire
03	2014
02	2048
01	2079
1	2109
2	2124
3	2134
4	2167
5	2185
	high fire
6	2232
7	2264
8	2305
9	2336
10	2381
	over the top porcelain
11	2399
12	2419
13	2455
14	2491
15	2608

Colorant Chart

Color: Mineral Oxide and
Carbonates:

Black:	Cobalt and Manganese and Iron
Blue:	Cobalt
Turquoise:	Copper
Slate Blue:	Nickel and Zinc
	Rutile
	Chromium
Brown:	Iron
	Manganese
	Nickel
Green:	Chromium (low fire)
	Copper
Gray	Iron
Green:	Nickel-Magnesia
Red:	Copper with Tin
	Chrome (low fire)
Orange:	Chrome with Tin (low fire)
Pink:	Chrome with Tin
Coral:	Chrome with Lead
Purple:	Manganese
	Iron
Tan:	Manganese
	Rutile
	Antimony
Yellow:	Uranium
	Zirconium-vanadium
	Tin-vanadium