**Properties of Clay**

**Plasticity** – The physical property that allows clay to keep any new form it is given. Clay and soil have essentially the same chemical makeup or formula. The reason clay is plastic is due to the physical difference, not the chemical.

**Stages clay goes through as it dries:**

**Slip** – a mixture of clay and water used in joining clay and decoration

**Plastic Clay** – clay that is workable and can retain its form given

**Leather-hard Clay** – clay that has dried past plastic, but before bone dry, clay in this stage can still be joined and carved

**Bone Dry Clay** – Clay in which most of the water has evaporated out

**Forces That Work On Clay**

**The Artist:** The artist forms the clay.

**Evaporation:** Clay dries when exposed to the air. Humidity (moisture in the air) controls the drying rate.

**Absorption:** Water in the clay is absorbed by the hands and surfaces upon which the clay is worked.

**Shrinkage:** As the clay dries, it gets smaller. As the clay is fired its shrinks at a specific shrinkage rate as determined by the type of clay.

**Gravity:** Wet clay is weaker than dry clay and can “Slump” due to gravity. When designing pottery, keep this force in mind because it can affect the feasibility and difficulty of construction.

**Basic Pottery Terms**

**Ceramics** – the art of making and firing items using clay

**Pottery** – items made out of clay, usually includes vessels and functional items

**Vessel** – a container usually associated with holding liquids

**Greenware** – any unfired clay, note unfired clay can be recycled, however once it has been fired it cannot be recycled

**Bisqueware** – ware that has gone through the first firing, low temperature and still remains porous

**Grog** – crushed ceramics or organic material that makes clay more porous

**Functional** – refers to pottery that has a use (example: cup, bowl, or plate)

**Non-Functional** – refer to pottery with no specific use can be sculptural in nature.

**Types of Clay**

**Clay Body –** this is a mixture of clay, minerals, and a variety of other ingredients that make up a type of clay

**Earthenware** – low fire clay that remains porous after firing.

**Stoneware** – mid to high fire clay that is dense, non-porous, and hard after firing.

**Porcelain** – high fire clay that is pure clay and is usually translucent.

**Kaolin** – or pure clay, typically used in white clay bodies like porcelain

**Construction Methods and Processes**

**The Slip and Score Method of Joining Clay**

1. Make sure both piece contain about the same amount of water (Moisture Content).

2. Score both surfaces to be joined

3. Add slip to one surface

4. Join with force

5. Smooth across the seam

**Wedging Clay** – Eliminates air bubbles and makes the clay more consistent. Types of wedging are Kneading, Wedging, Spiral Wedging and Ram’s Head Wedging

**Pinch Method** – Refers to the method of squeezing clay between your thumb and fingers. One basic form would be a pinch pot which is usually formed using one piece of clay.

**Coil Method** – This method of forming clay requires you to roll out long coils that are added to a base. This method allows you to use smaller pieces to construct a larger from allowing you also to control the moisture content more easily.

**Slab Method** – This method uses slabs of rolled out clay to join to together to make vessel. This method also allows you to make larger pieces however additionally this process can be used to make larger surface areas and more geometric forms that would not be as possible using the other methods.

**Wheel Throwing** – This method uses a potter’s wheel to shape the clay, also known as throwing. The wheel creates centrifugal force that allows the artist to create forms quickly.

**Kilns and Firings**

**Kiln** – is an enclosed structure used to fire clay up to high temperatures. Kilns can be fueled using different materials – electricity, natural gas, wood, coal, propane or oil

**Firing** – heating clay to high temperatures in order to make it durable and strong

**Pyrometric Cones** – (Cones) are small cone like shapes that are comprised of ceramic materials designed to bend when a certain temperature is reached

**Low fire** – refers to clays and glazes fired to cone 015- cone 02

**Low-mid fire** – refers to clays fired to cone 01 – cone 3

**Mid fire** – refers to clays and glazes fired to cone 4 – cone 7

**High fire** – refers to clays and glazes fired to cone 8 – cone 12

**Vitrification** – clay becomes hard, dense and non-porous and glasslike in nature, this typically occurs during the glaze firing

**Stages of Firing’s**

**Bisque Fire** – Unglazed pottery is fired to a temperature that will make the clay strong but porous (Having Minute passageways). Porosity is necessary for the clay to accept the glaze. During this firing the clay will shrink in size, the percentage that the clay shrinks is called the shrinkage rate.

**Glaze Fire** – Glazed pots are fired to a temperature that will cause the clay to become **vitreous** (hard, dense and non-porous) and the glaze will mature and form a glass-like substance.

**Types of Kilns**

**Updraft Kiln** – is a kiln that draws heat and flames up through the top of kiln

**Downdraft Kiln** – a kiln that draws the heat and flames down through opening located at the base of the kiln

**Parts of a kiln**

**Chamber** – the area inside the kiln where pottery is placed to be fired

**Firebox** – the section of the kiln where the fuel is added

**Flue** – an opening in the kiln that allows gases to escape as pottery is fired

**Muffle** – the area of the kiln that protects the pottery from the direct flame, not found in all kiln setups

**Peephole** – a hole in the kiln that allows the operator to view the firing as it progresses

**Atmospheres in Kilns**

**Oxidation Atmosphere** – an environment created during firing in which oxygen is introduce into the kiln

**Reduction Atmosphere** – an environment created during firing in which oxygen is restricted into the kiln

**Basic Parts of Pottery Vessels**

**Foot** – the base of the vessel upon which it stands

**Body** – the main part of a vessel, usually the largest

**Shoulder** – the part of the vessel that curves typically inward as it approaches the neck

**Neck** – the narrower part of the vessel between the shoulder and lip

**Mouth** – the opening of the vessel

**Lip** – the rim at the top of the vessel

**Advanced Hand Building Techniques**

**Molds** – a form used to shape clay

**Press Mold (also known as a Sprig Mold)** – open form one piece molds into which the clay is poured or pressed

**Hump Mold (also known as a Drape Mold)** – a convex support mold that holds clay in a certain shape until it hardens

**Slump Molds** – a concave support mold that holds clay in a certain shape until it hardens

**Maquette** – a small, quickly made preliminary version of another larger piece to be created similar to a sketch used in drawing

**Relief** – Sculptural techniques that uses raised surfaces that project from the background

**Low Relief** – (also known as bas-relief sculpture) – this type of relief uses forms that project only slightly from the background and has a shallow depth

**High Relief –** In this type of sculpture, the forms project further out from the background, has a greater depth and makes use of larger undercuts that show more form

**Pulling** – stretching or stroking plastic clay to elongate the clay typically used in creating handles

**Extruding** – shaping clay by forcing clay through a die to give it a variety of shapes

**Wheel Throwing Techniques**

**Wheel Throwing** – This method uses a potter’s wheel to shape the clay, also known as throwing. The wheel creates centrifugal force that allows the artist to create forms quickly.

**Centering** – the process of aligning the clay on the wheel head to correctly position the clay and make it even

**Opening** – the process of making an hole in a centered piece of clay, this process allows the clay to be shaped into its basic form

**Trimming** – the process of removing clay when the piece has reached the leather hard stage. This process can be used to create a foot on a wheel thrown vessel or trim the vessel to its intended form

**Potter’s Wheel** – A device used to throw clay forms or vessels. They can either be manual or human powered (Kick Wheels) or electric.

**Wheel-head** – the flat plate that rotates on the potter’s wheel and is the surface on which clay is thrown.

**Bat** – can be used as a base for working with clay these can typically be made out of plastic, plaster, wood

**Chuck** – a clay form that can be used to trim leather-hard pieces of clay

**Calipers** – a tool that has a hinge used in measuring diameters of clay work

**Decorating Techniques**

**Burnishing** – uses a smooth object to polish the surface of a leather hard piece that produces a shine when firing at low temperatures

**Incise** – the process of removing by carving

**Inlay** – Filling in impressed or incised areas in your clay with colored clay

**Mishima** – Filling in impressed or incised areas in your clay with a colored slip

**Paddling** – hitting the clay with a flat piece of wood to create strong joints, alter the shape and add texture to clay

**Piercing** – uses a variety of tools to cut holes in clay as decoration

**Sgraffito** – a process in which colored slip is added to the piece and scratched through to reveal the clay body beneath

**Slip Trailing** – a process that uses lines or shapes of slip as a decoration

**Sprig** – a relief decoration that is attached to a piece with slip

**Glaze Information and Techniques**

**Glaze** – a glasslike substance comprised of three basic ingredients: silica, flux, and alumina

**Three Basic Ingredients in Glazes**

**Silica** – referred to as the glass former. This is most commonly found in sand

**Flux** – reduces the temperature at which silica melts

**Alumina** – stabilizes the glaze to keep the glaze from running off the piece

**Glaze Related Terms**

**Underglaze** – oxides or commercial colorants, applied before glaze application

**Overglaze** – a glaze designed to go over another glaze after the piece has been fired once

**Stains**-pigments used for coloring clay bodies and glazes.

**Engobe** – slip that contains colorants

**Luster** – a decoration that creates a metallic sheen to a glazed surface

**Oxide** – a compound used coloring clay bodies and glazes it is comprised of oxygen and other elements

**Carbonates** – a compound used coloring clay bodies and glazes it is comprised of carbon and other elements

**Colorant** – a compound or element that can be added to create color in clay, slip, and glaze

**Opacifier** – an element that can be added to glaze to make a glaze opaque

**Translucency** – glaze that allow light to pass through

**Matt** – dull surface in glaze

**Glossy** – shiny surface in glaze

**GLAZE APPLICATION**

**Spraying** – a method of applying glaze with a spray gun

**Dipping** – a method of applying glaze to a piece by immersing it in a container of glaze

**Pouring** – a method of applying glaze to by pouring glaze into or on the piece

**Brushing** – a method of applying glaze using even brush strokes can be used to avoid thick deposits of glaze where strokes overlap, also may require several coats depending on the glaze

**Dry Footing** – removing glaze from the bottom rim of a piece so that it can be fired standing on a kiln shelf, without stilts

**Wax Resist** – the application of melted wax to the foot or body of a clay object to resist the glaze

**DEFECTS IN GLAZES**

**Blistering** – this is cause by gases escaping when a glaze is firing too fast or the coat of glaze is too thick

**Crawling** – a glaze defect in which the glaze rolls away from areas of the piece it is on leaving bare parts

**Crazing** – a glaze defect resulting from lack of fit between a glaze and the body it is on so that fine cracks appear on the glaze

**Running** – this defect occurs when a glaze has too much flux this cause the glaze to run down the pot onto the kiln shelf, it may need to be broken away from the kiln shelf to remove

**Pinholes** – a glaze defect caused by rapid firing, rapid cooling, or by tiny air holes in the clay