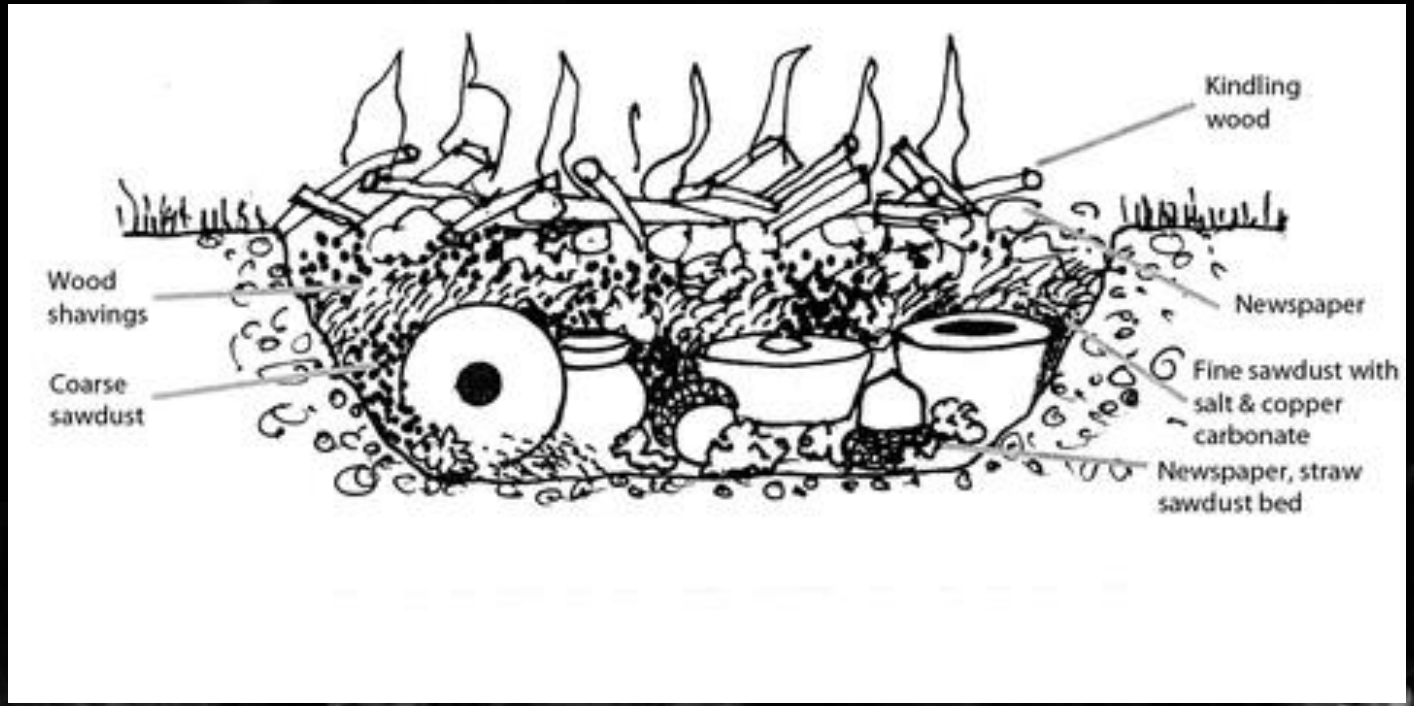

Project Glaze:
Barrel-Firing Technique

History of Barrel-Firing

- What is barrel-firing?
- First we need to understand “bisque” firing vs. “glaze firing”

Pit-Firing


Kindling wood
Wood shavings
Newspaper
Coarse sawdust
Fine sawdust with salt & copper carbonate
Newspaper, straw sawdust bed

Raku Firing

Artist Inspiration: Jane White

Our Experiment

To conduct a pit-fire above ground, we experimented with “barrel-firing”.

This process includes punching holes in metal trash cans and replicating the pit-pire inside the container.

We will do three rounds of firings, each with three different trash cans.

Firing 1: All natural materials

Firing 2: Chemical washes

Firing 3: Combining everything together

Hypothesis

We believe that the natural materials will be more inclined to produce interesting textures whereas the transition metal washes will produce more consistent, vibrant colors.

Our Controls

Why did we choose to make a cup and vertebrae for each material?

How do we control the barrel firings to produce comparable results?

How will black smoke affect our results?

How will dryness of materials affect our results?

What kind of weather did we work in?

33 COLORANT MATERIALS TO ADD TO A PIT OR BARREL FIRING

Colorants can be added in the sawdust layers, sprinkled on or around each piece, or thrown at the pieces during firing. Each of these techniques could produce different results. The presence of copper, salt, and iron are the key to getting significant colors in the pit.

Material	Color(s) It May Produce
Sawdust	black, gray, blue-gray
Cow pies (grain-fed)	green, gray, black, brown, blue
Cow pies (grass-fed)	black, yellow
Cat litter	various
Bark	various
Dried flowers	various
Leaves	brown, green
Grass clippings	brown, green
Hay or straw	various
Pinecones	various
Pine needles	various
Driftwood	blue-gray, aqua, gray, black (saltwater driftwood will leave different colors than freshwater driftwood.)
Seaweed	brown, rust, tan (saltwater seaweed will leave different colors than freshwater seaweed.)
Kelp leaves	yellow, orange, peach
Kelp pods	orange, brown
Eggshells	leaves texture

Material	Color(s) It May Produce
Nutshells	various
Citrus rinds	various
Tea bags	various
Table salt	orange, yellow
Sea salt	salmon, orange, yellow, gold, peach
Bacon grease	brown-green
Banana peel	green, gray
Coffee grounds	brown, green, blue
Bones	blue
Dry dog or cat food	various
Multivitamins	various
Baking soda	various
Alum	various
Copper wire	red, black, blue, green, white (depends on the wire)
Steel wool	blue, gray, pink
Nails	blue-gray dots with halos
Epsom salt	various

**"Various" indicates that results are not consistent enough to accurately guess what color they will create.

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Sawdust	black, gray, blue-gray
[redacted]	
Dried flowers	various
Leaves	browns, green
[redacted]	
Eggshells	leaves texture

Material	Color(s) It May Produce
[redacted]	
Citrus rinds	various
Tea bags	various
[redacted]	
Banana peel	green, gray
[redacted]	
Bones	blue
[redacted]	

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Process: Barrel-Firing with Natural Materials

Natural Materials

1. Eggshells: Texture

Eggshells contain calcium carbonate which is not highly flammable.

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Natural Materials

1. Eggshell Results:

They not only left an interesting texture, but there is a subtle burnishing of yellow that is likely a result of the egg itself.

Natural Materials

2. Chicken Bones: Blue

Chicken bones contain calcium carbonate and phosphate.

Phosphorus produces a pale blue-green flame when added to fire.

Natural Materials

2. Chicken Bones Results:

Because the chicken bones are not made entirely from phosphorus, this may be a part of the reason there is not much of a colored effect on our pieces.

Natural Materials

2. Banana Peels: Green/Grey

Banana peels are high in potassium. When potassium is added to fire, it can produce a lavender flame and green vapor.

Natural Materials

3. Banana Peel Results:

We chose a mixture of damp and dried peels since potters often experiment with both. The product did not yield much of a color, but if you look closely at the form, you can see a small texture left behind by the veiny parts of the peel.

* many of the peels were likely too wet!

Natural Materials

4. Orange Peels: various results

Like a lot of the natural materials we chose, orange peels are mostly made of organic compounds. There is not a predominating element in this materials that may affect the color.

Organic compounds typically release a brownish gas.

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Alum	various
Copper wire	red, black, blue, green, white (depends on the wire)
Steel wool	silver, gray, pink
Nails	blue-gray dots with halos
Epsom salt	various

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Natural Materials

4. Orange Peels Results:

These are also a mix of damp and dry peels. They did not promote the fire too well and that is likely why there is not a dense amount of black smoke. There is a small amount of brown staining.

Natural Materials

5. Dried Flowers: various results

We used a miscellaneous bouquet of flowers.

The different natural pigments of the petals may leave staining behind on the pieces.

Natural Materials

5. Dried Flowers Results: texture!

The dried flowers left behind a beautiful silhouette.

Since we used completely dry materials, the fire produced a very dense amount of smoke and coated our pieces entirely with the black color.

Natural Materials

6. Tea Bags: various results

Similarly to orange peels, there is no predominating element.

Black tea contains a lot of polyphenols which are organic compounds. Organic compounds tend to release brown gas.

Natural Materials

6. Tea Bags Results:

Since this material was placed in the barrel with the dried flowers. The dryness helped produce a lot of black smoke. There was a lot of texture left behind by the teabags.

Results: Natural Materials

Chicken Bones, Flowers, Tea Bags

Results:Natural Materials

Banana Peels, Orange Peels, Egg Shells

Results: All Natural Materials

Conclusion and Issues

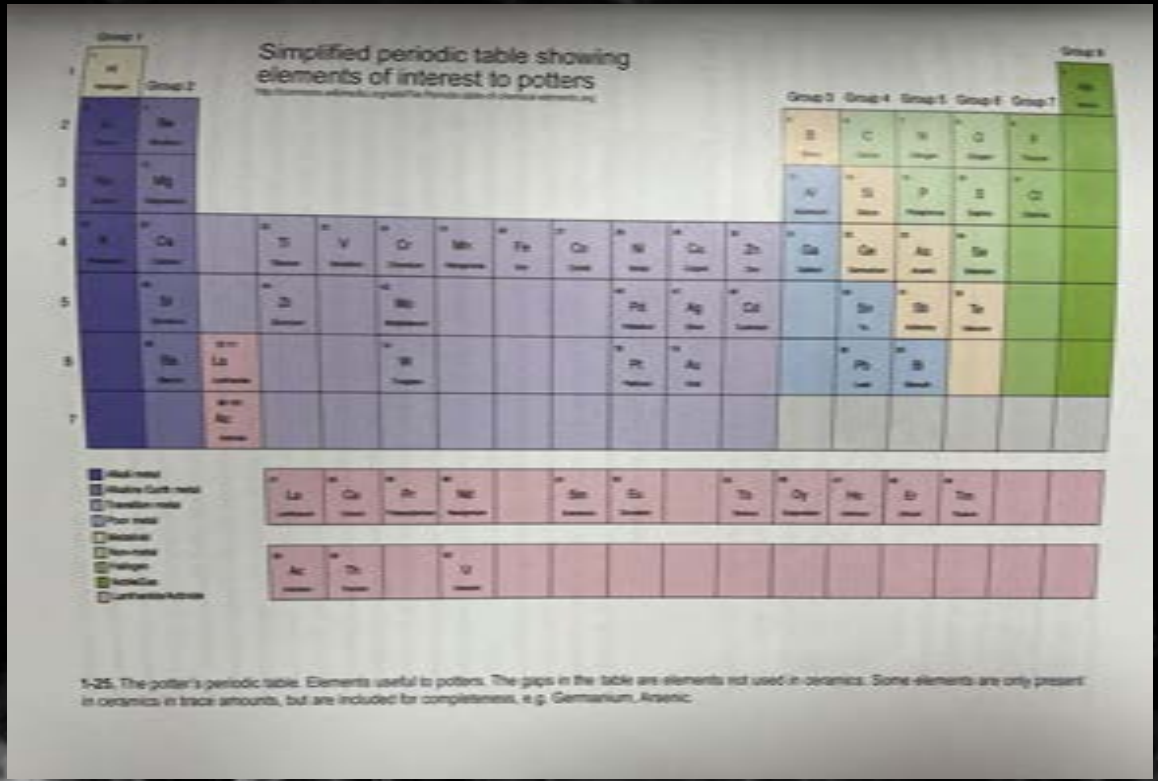
A lot of our results reveal blackened, textured materials, but we were anticipating more color.

We ran into issues keeping the fire ignited in the small trash cans and our use of sawdust as the main combustible material did not help either.

With this in mind (and the unease of public safety), we placed these smaller trash cans in larger ones. This switches up our controls, but it is necessary if we want to proceed with successful firings.

New Firing Method

Why Transition Metals?



1-25. The potter's periodic table. Elements useful to potters. The gaps in the table are elements not used in ceramics. Some elements are only present in ceramics in trace amounts, but are included for completeness, e.g. Germanium, Arsenic.

PG 22 of *Science for Potters* by Linda Bloomfield

The Visible Light Spectrum

The visible light spectrum is the section of the electromagnetic radiation spectrum that is visible to the human eye.

Wavelength (nanometers)

ThoughtCo.

Formulas from *Amazing Glaze* by Gabriel Klein

Cobalt Wash -

- 50.00%...Ferro Frit 3124
- 50.00%...EPK
- With an additional 25.00%...Cobalt Carbonate

Red Iron Oxide Wash -

- 50.00%...Ferro Frit 3124
- 50.00%...EPK
- With an additional 50.00%...Red Iron Oxide (Fe_2O_3)

Copper Oxide Wash -

- 50.00%...Ferro Frit 3124
- 50.00%...EPK
- With an additional 50.00%...Copper Carbonate

Process: Chemical Washes

Process

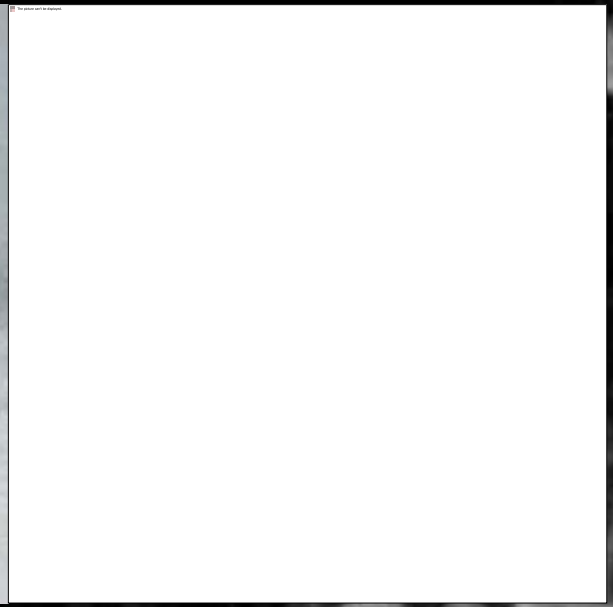
Results: Chemical Washes

Copper Oxide Wash, Cobalt Wash, Red Iron Oxide Wash

Combining it All Together

Results: Natural Material Combination

Results: Chemical Wash Combination



Results

Results: Mixture of Everything!

Results: Everything!

Special Thanks to Dr. Carlisle!

Questions?

References

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