ART!

Academic Resource for Teachers & Students

GROUNDBREAKING

02.24.17 – 04.16.17

6-8

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lesson overview

lesson plan
Designed to extend and enhance the learning experience of our exhibits while linking to core curriculum subject matter.

lesson objectives
- To learn about kilns and how they work.
- To understand that the color made by a glaze is a product of a chemical reaction.
- To experiment with oxidation and understand its part in the firing process.

core curriculum tie-ins
Sixth through Eighth Grades: Visual Art and Science.

lesson overview
On the A.R.T.S. tour, students will learn about the work of the artists featured in the exhibit *Groundbreaking* and how their practices are rooted in the multicultural history of glazing. Students will learn about the chemical properties of glazes and the stages of firing. They will experiment with the process of oxidation to create an art piece.

length of class
One to Three Class Sessions.

supplies
- Projector set-up to show videos.
- Salt.
- Bowl and Paint Brush.
- Paper Towels.
- Pennies.
- Vinegar.
- Apples.
- Spot lights.
- Lemons.

LAUREN MABRY – COMPOSITION OF ENCLOSED CYLINDERS (SIDE 1)

core curriculum tie-ins

6th grade Visual Art

Standard 6.V.CR.1:
Combine concepts collaboratively to generate an innovative idea for art-making.

7th grade Visual Art

Standard 7–8.V.CR.5:
Demonstrate persistence in developing skills with various materials, methods, and approaches in creating works of art or design.

8th grade Science

Benchmark:
Chemical change is a primary way that matter on earth changes from one form to another. Energy is involved in chemical and physical change. When chemical or physical changes occur, the total amount of matter and energy remains the same; this is the law of conservation of matter and energy. Matter can change states through physical change. In a physical change the identity of the atoms does not change. In a chemical change the identity of the atoms does not change, but the atoms are recombined into a new substance.

Standard 1:
Students will understand the nature of changes in matter.

Objective 2: Observe and evaluate evidence of chemical and physical change.
b. Identify observable evidence of a chemical change (e.g., color change, heat or light given off, change in odor, gas given off).
c. Observe and describe chemical reactions involving atmospheric oxygen.


STEVE SNIPES - LA DEE DA


LAUREN GALLASPY - UNDONE (BACK)


STEVE SNIPES - BATHERS 02

ABOUT

Groundbreaking

In Groundbreaking, come see historical tableware patterns that have been reimagined across large installations, vessels that have been deconstructed and pushed almost to the point of collapse, and figures that, while rooted in traditional forms, have become canvases for approaches that are psychological, conceptual, and abstracted.

For thousands of years, clay has been dug from the ground and transformed into objects of functional, symbolic, or decorative use. Groundbreaking presents compelling works by 12 artists turning longstanding traditions upside down. With work by Akio Takamori, Lauren Mabry, Christina West, and more, the exhibition brings together nationally-recognized artists from across the country who are creating riveting new compositions and pushing the boundaries of clay.

KURT WEISER – TFRUIT STORY

AKIO TAKAMORI – A

LAUREN GALLASPY – THIN SKINNED

lesson plan

1. How do clay artists add color to their artwork? Look closer at the surfaces of the works in the exhibit *Groundbreaking*. Make a list on the whiteboard as students describe the textures and colors they observe. Introduce words like: shiny, matte, glossy, detailed, drips, drawn, etc. Ask students to speculate on how the artists created or achieved these colors.

2. Introduce the definition of a glaze. Ceramic glaze is an impervious glass layer or coating that has been fused to a ceramic body through firing. Point out to students that glaze is different than paint. Glazes need to be fired. They have both a decorative function and serve to seal the the ceramic object. The color of glazes comes from a chemical reaction that happens in the kiln under heat. (see resources below to expand on the chemical contents of glazes). Every glaze contains silica (glass), a flux (that allows the glass to spread and melt at a lower temperature) and a refractory (that slows down the movements of the glaze).

3. Students will participate in two experiments to observe the differences between additive color mixing and a chemical reaction. It is important to note that in a chemical reaction energy is involved. In a kiln that energy is heat. In a chemical change the identity of the atoms does not change, but the atoms are recombined into a new substance.

4. To emphasize the difference between a physical change (paint mixing) and a chemical change (firing a glaze) demonstrate color mixing by using food coloring dye. In a clear cup of water add a few drops of red color dye and blue color dye. Students will observe that the state of the matter does not change, a new substance is not created and the two colors simply mix.

5. To show a chemical reaction causing a color change students can perform an experiment using pennies, salt and vinegar. As a class, place the pennies onto the paper towel and sprinkle the pennies with salt.

FRANCESCA DIMATTEO - (DETAIL)

FRANCESCA DIMATTEO - (DETAIL)

lesson plan (cont.)

Have students discuss what they think might happen. Make a list of the variables in this experiment and have students draw conclusions about the effects of vinegar, salt and oxygen (To see results, the pennies will have to sit for at least 24hrs).

6. After a day, have students record and then share their observations. Explain to students that pennies are largely made of copper, which means they oxidize just like many other metals. Oxidizing metals is one of the ways a kiln turns the silica and metals from a glaze into vibrant colors. Students will see that instead of rusting, pennies simply get covered in a coating of green. The vinegar and salt desolve the top copper-oxide layer of the penny. Then the copper atoms mix with oxygen in the air and chlorine in the salt. This creates a blue-green substance known as malachite. Because oxygen is nessecary for this reaction it is called oxidizing**.** Explain to students that in a kiln the heat allows molecules to break free and then oxygen can attach to the remaining materials, forming oxides.

7. Another example of oxidation is what happens to an apple when it is cut open and left exposed to air. In this experiment, heat can release carbon that then comes into contact with oxygen turning it light or dark brown. Students can create art using the principles of this chemical reaction.

(Optional: Show students the work of Alwyn Obrien who uses slip in an unconventional way and creates wall drawings).

9. Before class, prepare a mixture of lemon juice with water in a pitcher (a teaspon of water for every half of a lemon). Pass out printer paper, brushes and a small bowl of the lemon water to students. Students can start drawing, using the invisible ink. When they are finished, they can hold up their drawing to the heat of the lamp and see them appear. Explain that for their safety, students should not touch the lightbulbs or put their drawing too close to them. Have students discuss how the 'ink' is revealed.

TAKIAMORI - A

TAKIAMORI - U

vocabulary

Chemical Reaction – A chemical reaction is a process that involves rearrangement of the molecular or ionic structure of a substance, as opposed to a change in physical form or a nuclear reaction.

Flux– Flux is any of various substances that enhance the flowing together of metals, as in soldering.

Glaze – A glaze is a a vitreous substance fused on to the surface of pottery to form a hard, impervious decorative coating.

Kiln – A kiln is a furnace or oven for burning lime, hardening pottery or brick, drying lumber, or the like.

Oxidation– the chemical process in which oxygen is combined with another element or compound to form a different compound.

Refractory – A refractory is a a substance that is resistant to heat.

Silica – Silica is a crystalline compound of silicon and oxygen that is widely found in quartz, agate, sand, and the like, and used in making glass, concrete, and ceramics.

Surface – The surface is the the topmost layer of something.

ADAM SHIVERDECKER – CHEMICAL CAUTION

resources

Experiments with Color:

http://www.middleschoolchemistry.com/lessonplans/chapter6/lesson1

http://www.pbslearningmedia.org/resource/phy03.sci.phys.matter.lp_fireworks/igniting-chemistry-in-fireworks/

http://www.coffeecupsandcrayons.com/simple-heat-experiment/

https://www.education.com/science-fair/article/colors-ceate-heat/

http://www.rsc.org/learn-chemistry/resource/res00000712/the-thermal-decomposition-of-nitrates-writing-with-fire?cmpid=CMP00005968

Oxidation:

http://www.seplessons.org/node/1690

https://docs.google.com/file/d/0B-cVjZBMBNNXV0Q2QWpaX-3FuS3M/edit

Kilns and Firing:

http://ceramicartsdaily.org/ceramic-glaze-recipes/glaze-chemistry-ceramic-glaze-recipes-2/a-super-simple-analogy-to-help-you-understand-glaze-structure/

http://www.lakesidepottery.com/HTML%20Text/Tips/Mixing%20and%20Using%20Glazes.htm

http://home.howstuffworks.com/green-living/pottery6.htm

MOLLY HATCH – ASPIRE