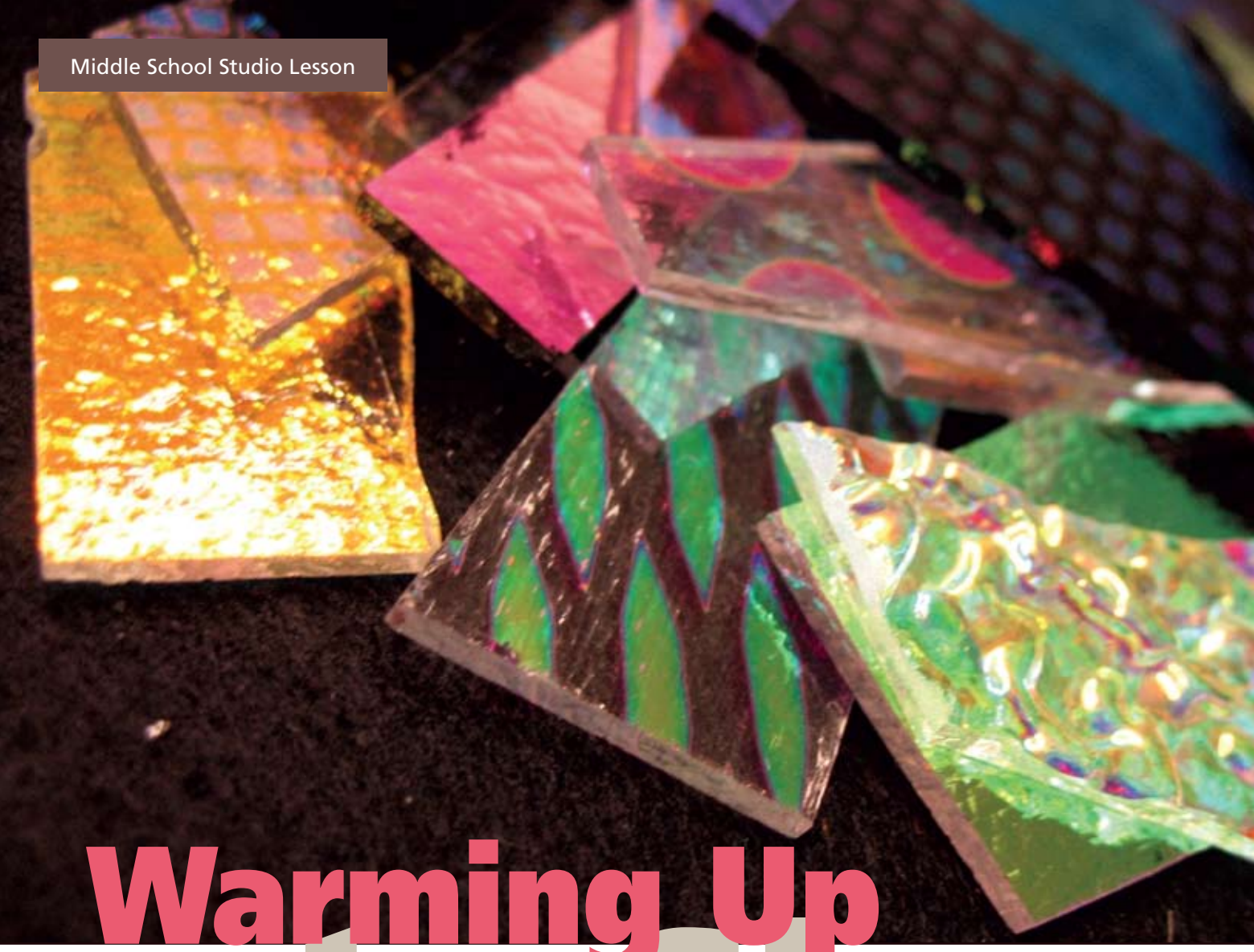

Warming Up to Glass

Tana Mendenhall

Warm glass produces unique art objects that cannot be replicated with any other method. The term "warm glass" is interchangeable with the term "glass fusing"; both are used to describe the method of using a kiln to join pieces of glass together.

Quite simply, when heat is applied to glass, it will soften and eventually become fluid. When the glass reaches a fluid state, pieces will meld together to create one glass object. While finished warm glass products have an air of mystery about their creation, glass fusing is actually quite simple.

Glass Fusion: A History

Archaeological evidence suggests that early Egyptians had knowledge of basic glass fusing techniques, but it was the Romans who perfected it some years later. With the introduction of the blowpipe, fusing fell from favor because glassblowing offered a quicker way to create glass objects. Glass fusing did not regain wide popularity until the turn of the twentieth century. Since the 1960s, glass fusing has become popular as a hobby, but it is still not used for large-scale production.

Glass Fusing Equipment and Tools

- **Glass cutters** are used to score glass so that it can be broken into specific shapes and sizes. A pistol-grip glass cutter is recommended as it dispenses oil while cutting the glass and helps to create smoother, cleaner cuts.
- **Running pliers** have a flat head and are used to grip glass along the scored edge.
- **Groziers (breaker) pliers** have a ser-

Samples of COE 90 glass.

Completed pendant.

rated edge that can be used to chew away rough spots on edges.

- **Heat-resistant gloves** are thick and cover the fingers, hand, and lower arms. Use them to open a hot kiln, remove the hot shelves, and handle hot glass.
- **Goggles or safety glasses** cover the eyes and should be worn when cutting glass or viewing the glass while it is fusing.
- **A haik brush** is a soft brush used to smoothly apply kiln wash.
- **A kiln** that is capable of reaching temperatures of about 1500°F is required. While kilns used for clay will serve the purpose, it is better to use a kiln that is specifically for glass.
- **Shelves** made from clay or other material. It is advisable to have more than one shelf so that while one load of glass is cooling, another can be prepared for firing. Use stilts to stack shelves.

Glass Fusing Materials

- An assortment of glass that is either COE 90 or COE 96, a notation that refers to the coefficient of expansion and contraction of glass. The two coefficients cannot be used together. Varied rates of expansion and contraction will cause the pieces to break during fusing.
- Kiln wash should be used on the interior surfaces and shelves in a 5:1 ratio (water: wash). A 1:1 ratio should be used the first time a kiln is used. Smoothly apply the wash so that it does not leave marks on the fused glass. Use caution not to inhale the wash when mixing it.
- White glue, adhesive, and jewelry findings will be needed for assembling the pieces.

Preparation

It is advisable to pre-cut the glass for students to prevent injuries. Use cutting mats or boards to protect tabletops when cutting glass. To cut glass, first clean the cutting surface. Debris under the glass can cause it to unexpectedly break. Next, score the glass with a glass cutter, then grasp the glass with running pliers, and twist to break it along the scored line. Use grozier pliers to clean the edges if needed.

Prepare a heat-resistant area where glass can cool after being removed from the kiln. Be careful not to place hot shelves on laminate or other easily damaged surfaces.

Production

Provide three to five pieces of glass to each student. Remind students that the glass is sharp. Encourage students to plan designs on paper before assembling the individual pieces of glass. Simple designs are almost always the best. Use a dark color as the base and build up no more than three or four layers. Use a drop of white glue to hold each layer in place. The glue will dissipate once the glass fuses. Clear glass as the top layer adds dimension to the finished piece. Fire the glass in the kiln and allow it to cool before adding the chosen jewelry findings.

Close and Extend

Take digital photographs of fused pieces before they are placed in the kiln. Compare the photograph to the finished piece. How did the fusing process change the design? How did the glass change? Why? Remind students that each piece of fused glass is a unique creation. No two pieces will be the same, even when they look identical before fusing.

Tana Mendenhall was an art education major at Northern Arizona University, Flagstaff when she taught this lesson.

NATIONAL STANDARD

Students intentionally take advantage of the qualities and characteristics of art media, techniques, and processes to enhance communication of their experiences and ideas.

WEB LINK

www.paragonweb.com/Kiln_Pointer.cfm?PID=293