

# AMACO Creative Glass Casting

Grade Level: 9-12

Lesson Plan developed by George Debikey

## Description:

Pâte de Verre is an ancient glass casting technique used to create solid objects that are very luminous due to the way they reflect light. This technique was practiced by the ancient Egyptians to produce beautiful amulets and gems. It was rediscovered and went through a revival period during the 1800s. Beautiful examples of that period are seen throughout the world. "Pâte de Verre" which literally means "Glass Paste" was made using fine particles of glass in a paste form to produce the castings. In this project however, we will use large chunks of glass (billets) or pieces of sheet glass. Unlike the matte finish usually produced by the pâte de verre technique, the finished surface of this project will have an attractive satin gloss.

## Objectives:

- Students will learn the process of creating a model, a mold from the model and will cast the model in glass.
- Students will learn safety procedures related to casting glass.
- Students will design a relief sculpture that will be successfully cast in glass.

## Materials:

*NOTE: The measurements in these instructions refer to the components of the AMACO® Glass Casting Kit. If you are using these instructions separately from the kit, you can apply them to any glass casting project and purchase the items individually.*

- AMACO® Glass Casting Kit (410651-705)  
The kit includes:
  - 5-Lbs. Modeling Clay
  - 10-Lbs. Coarse Casting Mix
  - 5-Lbs. Clear Billet Chunks
  - 2 Modeling Tools
  - Creative Glass Casting project sheet
- AMACO® 14" Plasti-bat (or other non-porous surface) (409330-705)
- Cardboard Box or Coddles for Frame
- Mixing Bucket
- Graphite-Film Lubricant (available at auto parts stores)
- Dish Soap
- Glass Cleaner
- An electric kiln with computer control or a kiln with a pyrometer and thermocouple-AMACO® Excel GSF-670 Kiln with Glass Select Fire is recommended (see Sax full-line catalog for various models of this kiln).
- Scoop
- Level
- NIOSH approved mask
- Safety Goggles

## Optional Materials:

- Modeling Clay
- AMACO® Glass Mosaic Chunks (see Sax catalog)
- AMACO® Glass Noodles (see Sax catalog)
- Stiff Brush
- Grinding Stone

## Directions:

1. Before you start, cut out 1/5 of the moist clay in the kit and put it aside to seal the casting frame with. Model a low relief image of your choice using the modeling tools included, or any other tools that you may have. Do not make it more than 1-1/2" thick or less than 1" thick. You may work freely on your model, slight undercuts will not cause problems. You can finish the surface any way you like. The finished glass surface will be exactly like your clay surface. The glass in the kit is sufficient for a model using only 4/5 of the clay you have in the kit (1/5 of the clay is reserved for sealing the mold).
2. Once your model is complete, prepare the mold for the glass casting. Choose a round or square cardboard box depending on your project. Remove the top and bottom. Place your clay model over a flat sheet of plastic, wood or glass. Place the box around the model and seal the bottom edge of the box with clay on the inside and outside so the Casting Mix will not seep under it. Make sure the height of the mold is between 1-1/2" to 2" higher than the top of your model.



3. Prepare the casting mix, reading the label for health cautions. Warning: Casting Mix contains silica, a carcinogen, so make sure to wear a NIOSH mask approved for dust and mist while working with the casting mix. Put four pints of water into a 2 gallon bucket and use a scoop to slowly sprinkle the Casting Mix into the water. Mix slowly, without trapping too much air and making sure all the dry material is well dispersed.
4. Pour Casting Mix into the mold. Avoid pouring directly over your artwork-pour on the side to avoid trapping air in the piece. Once you have all the mix in the mold, tap the side to help release any air trapped in the Casting Mix.
5. Let it set until completely cold, preferably overnight, then pull out the original clay model. Do not expect to save the original-you may have to dig it out, especially if there are undercuts. Be careful not to chip the mold in the process. Clean the mold and smooth out the edges with a damp sponge. Allow it to dry completely at room temperature.
6. Once the mold is completely dry, you are ready to cast the glass. The mold is ready for use as is however, if you spray it first with dry Graphite-Film Lubricant, it will separate easier from the glass. Place a plastic bag in the mold cavity and fill it with water to the top edge or the thickness you have planned for the art piece. Weigh the water in the bag and multiply by 2.5. This will be the weight of the glass needed to fill the mold to the desired thickness.
7. Place a refractory shelf in the kiln on top of 1" posts to raise it off the kiln floor. This improves heat circulation in the kiln. Place a 1/2" layer of sand on the shelf and position your mold on the sand. Use a level to make sure the mold is level in all directions, adjusting by pushing it into the sand as needed.
8. Wash the glass billets thoroughly with dish soap and water-rinse and dry. Wash them again with window cleaner and dry thoroughly. Stack the clean glass on edge in the mold cavity with taller pieces towards the center and shorter ones towards the outside. Avoid having pieces touching the wall of the mold and be careful not to chip the mold. If you want to add color to your piece, place Glass Mosaic Chunks or Glass Noodles in between the billets.
9. If you have an electronic control on your kiln, use your kiln's specific directions to program the following firing schedule:
  - a. Set the rise in temperature at 250°F per hour until it reaches 1250°F. Hold the temperature for 1/2 hour.
  - b. Keep the temperature at 250°F per hour until it reaches 1450°F and hold for 2 hours.
  - c. Crash cool to 950°F and hold for 6 hours for annealing.
  - d. Start cooling at 30°F an hour until it reaches 750°F.
  - e. Start cooling at 60°F an hour until it reaches 500°F.
  - f. Start cooling at 100°F an hour until it reaches 200°F then let the kiln cool to room temperature on its own.
  - g. If your kiln is not equipped with an electronic control, use a pyrometer and follow the above schedule manually. Caution: Do not open the kiln until it reaches room temperature. Do not remove the mold until it, too, has cooled to room temperature.
10. Once the kiln is at room temperature, open it and check the temperature of the glass. It will retain heat longer than the kiln chamber." When the glass is at room temperature, remove the mold and place it in a container of water. As the mold soaks, you will be able to break it away from the glass. The mold will be destroyed in the process. This is a "waste mold" for one time use only. Caution: Be extremely careful removing the mold-the glass may have sharp edges.
11. Use a stiff brush to remove any mold pieces stuck in crevices.
12. Wearing your mask and safety glasses, grind until smooth any sharp edges using a hand held grinding stone. Wash your glass art piece thoroughly to remove any particles from the mold or grinding.

**National Art Standards:**

Content Standard #1: Understanding and applying media, techniques and processes.

Grades 9-12, Proficient: Students apply media, techniques and processes with sufficient skill that their intentions are carried out in their artworks.

Grades 9-12, Proficient: Students conceive and create works of visual art that demonstrate an understanding of how the communication of their ideas relates to the media, techniques and processes they use.