



Mold Making with Silicone

Learning Objectives	<ol style="list-style-type: none"> 1) Students will be able to define casting and identify relevant industrial applications. 2) Students will be able to categorize objects based on mold design and casting material requirements. 3) Students will create their own silicone mold.
Time	1 hour
Topics	<ol style="list-style-type: none"> 1) Mold-making 2) Chemical Reactions

Before the Lab:

Supplies to buy every time you run the activity:

- 1) [Oomoo 30](#) or some other silicone molding material
- 2) Plastic cups or other disposable container for mixing of silicone components
- 3) Tongue depressors
- 4) gloves

Supplies to buy once:

- 1) Objects for molding (ex. [bath toys](#))
- 2) Hot glue gun
- 3) Measuring cups
- 4) Safety glasses for each student

Supplies to buy as needed:

- 1) Container to hold mold during setting that is large enough for objects being molded (ex. [popcorn buckets](#))
- 2) Glue sticks
- 3) Release agent of some kind ([Miller-Stephenson ms-122ad](#) or flour-based cooking spray ex. Baker's Joy)** only if using something other than popcorn buckets

Prior Knowledge

Recommended for Instructor:

- 1) Understanding of casting
 - Importance in society as a whole
 - Different materials and molds possible
- 2) Possible complications during metal solidification and polymer reactions

Prior Knowledge

Recommended for Students:

- 1) Basic understanding of chemical reactions



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Lab Set-up:

- 1) We run the lab with groups of 5 students.
- 2) Measure out equal portions of polymer A and B into separate cups.
- 3) Before the students arrive, make sure each station has:
 - a mixing bowl
 - One cup of Polymer A pre-measured in a paper cup
 - a Tupperware container that they will pour the mold into to set
 - gloves
 - safety glasses for each student
 - the students' molds at their table spots
- 3) In the middle of the table with the students, place a pile of objects for the students to make molds from.

Pre-lab Questions:

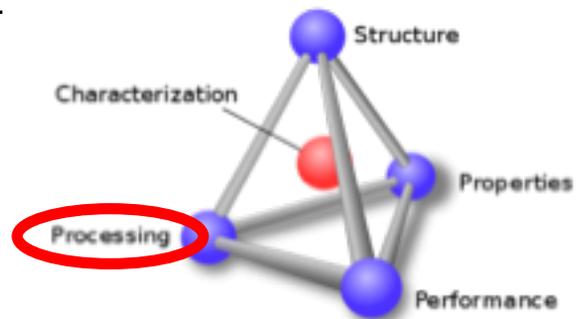
- 1) Making silicone molds fits in the processing category.

Please explain why it fits in the processing category.

Answer: The final product is made by combining two materials together (chemical processing).

- 2) How does temperature of the room affect the time it takes for a mold to solidify?

Answer: Heat gives the polymers thermal energy and lengthens the time of the cross-linking process.

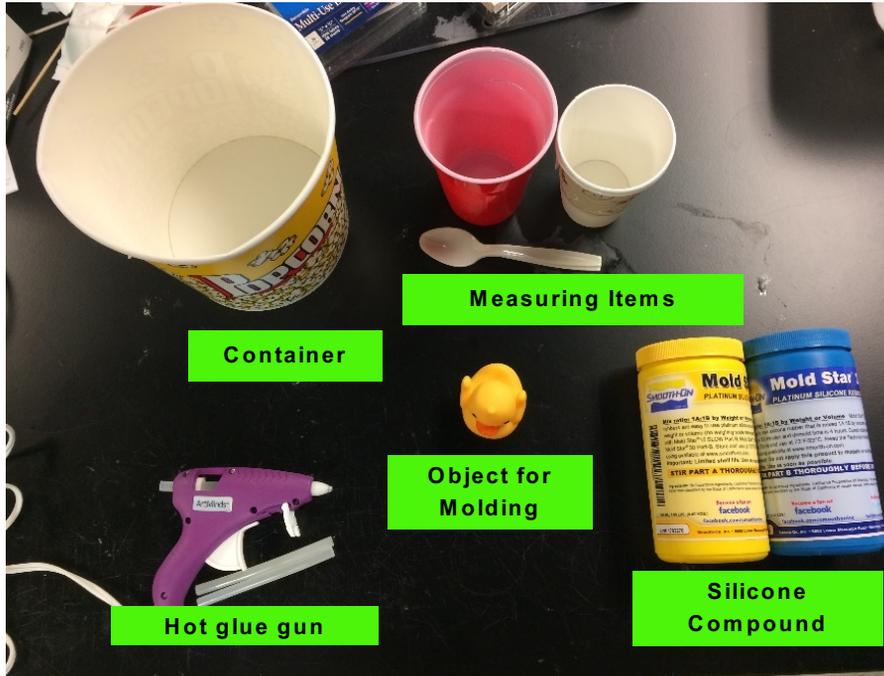


Running the lab:

- 1) Have the students sit at their stations and put on their safety glasses and gloves.
- 2) They should have already answered the pre-lab questions. Ask the students if they had any unresolved questions about the pre-lab questions.
- 3) Instruct the students to **read all of the directions**. At a certain point they will be asked to answer a concept check question. They will need to check their answer with a TA/instructor in order to get a certain piece of necessary equipment (in this case the pre-measured Polymer B and a spoon to stir the polymer components together)
- 4) Do not give them the instructions verbally. The goal is to get the students to read everything and think about why they are doing what they are doing. At this point let them jump in but encourage them to raise their hands if they have questions.

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Sample Station:



Safety note:

Make sure students are wearing safety glasses and gloves at all times.

Choosing a mold:

Students will have a variety of objects to choose from with which to make a mold. In this box the students will write why they chose the object they chose. They will also be instructed to tape their object to the bottom of their Tupperware container.

If students are having a hard time deciding, ask them what they think might be the easiest shape to make a mold from. The hope is they choose a mold with smooth edges and not too many detailed features.

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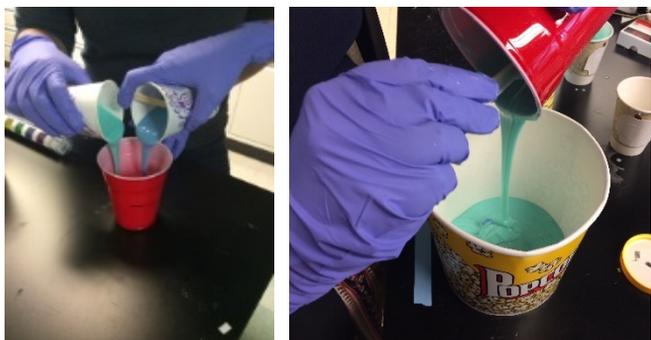
Concept Check: How mixed is mixed enough?

At this point the students will be asked to answer what would happen if the polymers are not fully mixed? How will they know when the components are thoroughly mixed?

Answer: If the polymers are not fully mixed then the cross-linking process will be incomplete and they will end up with portions of their mold that are unreacted and still in the liquid state. They should know mixing is complete when the whole liquid is one solid color that is distinct from either of the precursors.

When they answer correctly, the TA/instructor will bring them the pre-measured Polymer B and a mixing spoon.

Mix and pour your polymers:



Record Observations Here!

Ask students to record their observations while mixing and pouring their molds.

Ask students what to do about the air bubbles and how that might affect their mold.

-Gently tapping the container to make the air bubbles rise will result in a much sturdier mold.

Discussion points to cover after the activity:

- 1) What objects in this room could have been made using casting? Why do you think this?

- 2) Are you worried about anything for your animal?