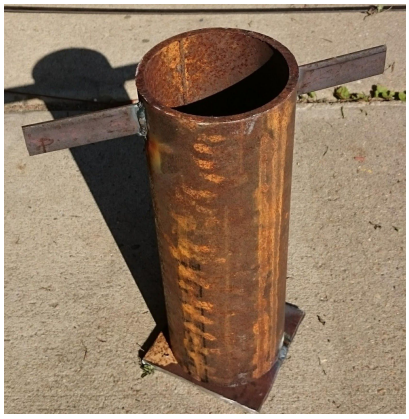
Casting Aluminum:

Description: Aluminum metal was casted into different molds. The zoology class wanted to study ant colonies to show the diversity of designs that ants use.

1st: Gather materials

Tallahassee Welding and Machining donated the metal that was welded into a crucible (4” x 12”)

We also gathered a hair dryer, steel pipe for air supply, and charcoal as fuel. Aluminum was chopped up from old robotic frames to be recycled.

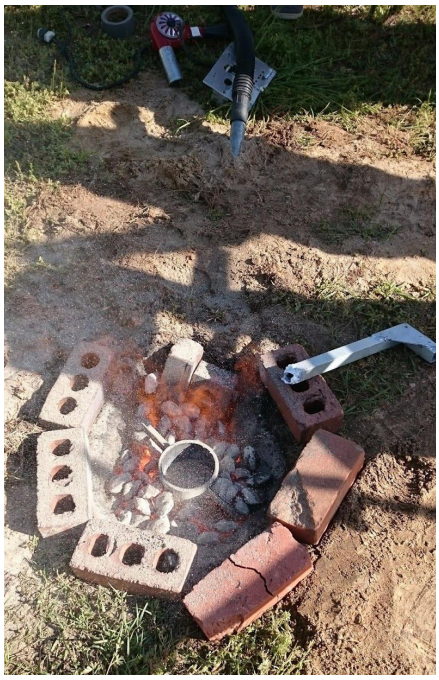


2nd: Prepping the molds

We crushed then put kitty litter in a blender and sifted it down to a fine powder. Some cat litters are 100% bentonite clay which can be used to create a green sand mix. This was mixed with sand to fill the molds and used around the ant hills to contain the aluminum. 3D printers and laser cutters were used to make the mold shapes. Then they were buried in sand to create a negative or void in the sand.

3rd: Melting the metal

Finally we dug a hole and set up the air blower, crucible, and charcoal and lit the fire. The air tube is at the top of the image, bricks were used to help contain the fire from spreading. Gloves and tongs were used to add aluminum to the crucible and to help pour the liquid aluminum. Aluminum melts at 1,200 F and after 30 min the metal began to melt and was continuously added, till the crucible was 75% full. To get even hotter the hair dryer was replaced with a shop vac to get even more air supply and heat to the molten aluminum. In the future we are going to look at getting a laser temperature sensor.



4th Pouring and removing the casts

The aluminum was poured and left to cool for several hours and then the excavated with shovels and cleaned off with hozes. Final casts can be seen below.