

Activity name: Recycled Aluminum Ornaments

This activity is meant to provide a real-world application of the ATEEC Recommended Core Curriculum's math, science, technical, communications, or critical thinking knowledge and skill concepts, which have been identified by the ATEEC Fellows as necessary preparation for environmental technology occupations.

Appropriate for which course(s)? Technology Studies or high school science

Concept/skill learned (i.e. from K/S Tables): Use of recycled products

Approximate time to complete activity: 2-5 hours

Source of idea or activity (for published source, please include author, title, publisher, date): Brainstorming session with other teachers at school

Materials/resources needed (equipment, print media, electronic media, videos, supplies, etc.):

- aluminum cans to be recycled, clean and dry
- heat source capable of melting aluminum, large gas burners work well for this
- small cast iron pot
- heavy heat resistant gloves and/or tongs
- metal container full of clean moist sand
- original items to be reproduced (shells, large plastic letters, large flat jewelry, etc.)
- stiff wire brush, large pliers, bucket of water
- outdoor area to work (this is a must, it can not be done indoors)
- safety equipment including leather aprons, gloves, face mask, and possibly a respirator (this item can usually be borrowed from a welding program if available)

Description of activity:

Aluminum is a metal that melts at a relatively low melting point, recycles easily, and is readily available. It is very important that students understand the potential safety hazards connected to this activity. Much of this equipment can be borrowed from welding programs for the day. Begin by melting down the aluminum in the cast iron pot. Aluminum should not stick to the pot, stainless steel can also be used but it will take some time and a large heat source. Students should carefully weigh the cans or at least count them as they melt. As the first few cans melt more can be added. This will create some very thick and nasty smoke, remind your students to stay out of this smoke and be sure it is not drawn into the school's HVAC system. Slag can be pulled off the surface of the molten aluminum with a large spoon or piece of heavy wire.

As the aluminum is melting prepare your molds in the sand. The sand should be slightly moist to hold together but not wet. We make only flat items so any item that can be pushed into the sand will work. Shells work well and large (2") plastic letters also work well. After enough aluminum is melted and the mold is ready the students will pour the molten aluminum into the mold, this is the most dangerous part of this activity. Other students will need to stay out of the way, sand that is too wet may possibly explode. The aluminum will harden very fast, and can be cooled by picking up with pliers and placing into a bucket of water. The cooled item can be brushed with the wire brush to get the sand off.

Extension activities could include:

- drilling a hole in the finished piece and using it as a key chain
- careful data collection will help to determine how many cans it takes to make a certain item
- weighing the final item against the weight of the aluminum cans shows the efficiency of recycling aluminum, and they can determine the approximate weight of the paint on the cans
- the finished items can be used as gifts or a fund-raising event

Activity submitted by: Ray Wishart

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