



Concrete Coasters

Completion time: 3 Lessons

Materials and Resources:

- Card, pencil, scissors, felt, craft glue, ruler
- Sheet MDF, 1cm thickness, machine or hand saw
- Disc sander, sandpaper, liquid concrete
- Drill and 1.5mm drill bit
- Formech vacuum forming machine
- Suitable plastic material (1.5mm HIPS or ABS recommended)
- <http://formech.com/case-studies/formech-at-the-french-pastry-school-chicago-usa>

Skills at a glance:

Mathematics

Measurement

Language

Reading, listening

Thinking skills

Adhering to a given brief, choosing a simple design

Science

Heating plastics and effects, plastic/polymer material knowledge

Project Outline:

This project takes things back to basics, providing a very quick, engaging, and easy introduction for students new to vacuum forming, or an ideal quick project for students of any age. It produces a set of 6 identical drinks coasters with very little tooling required, and no lengthy process. Using MDF to produce simple moulds, the final product will be cast using concrete, creating industrial and stylish coasters. They can be produced for student use, or due to their low cost and fast, easy production, could be made and sold as part of a school fundraiser or fair.

Method:

Students must first decide on the shape of their coaster set. They might be circles, squares, pentagons and hexagons. This shape can now be drawn six times and to the desired size on 1cm thick sheet MDF. These six pieces can now be cut out by either machine or hand saw.

These six identical shapes of MDF can now be taken to the disc sander, where each of their sides can have draft angles applied. Any sharp angles and corners can be softened by hand with sandpaper. Each individual mould will also require a venting hole drilled in its centre, using a 1.5mm drill bit.

They are now ready to be taken to the Formech machine, placed at least 2cm apart in the forming area, and vacuum formed using any available plastic material, although 1mm HIPS or ABS is recommended.

Students can now fill each of the six formed recesses within the plastic with liquid concrete, and tap the tray on the workbench several times to remove any air bubbles which may be in the concrete mixture. It can now be set aside to dry for 24 hours.

Once dried, the cast concrete shapes can be turned out onto a flat surface and have any rough corners lightly sanded by hand.

The concrete coasters will require a further 48 hours to dry completely.

Finally, each concrete coaster will need a layer of soft felt applied to their undersides to ensure they do not scratch any furniture they are placed on. Drawing around each coaster onto a sheet of felt material, material can be cut out and adhered to the coasters with glue.

The coaster set is now ready to be put into use with some cold drinks, or to be stacked and tied up neatly with some yarn to be given as a gift or sold.

Homework Tasks:

Students will use their vacuum formed product to mould and cast concrete. This process is a popular and much used application of vacuum forming, with countless well-known products produced this way. They might be tasked with researching what other products are formed using similar vacuum formed plastic moulds.

Optional Extras:

This project produces uniform concrete discs to be used as coasters, although this is just one application for the product. Students might imagine what other purpose this product might be used for. Assuming students chose hexagons as their uniform shape, these might be used as wall or floor tiles which align and interlock perfectly. With the addition of some simple grout they can be placed anywhere around the home or workshop. This further demonstrates the wide application of vacuum forming, as well as encourages students to think more in depth about its potential.

Student Accomplishments:

- The production of six uniform drink coasters
- Creating a mould with simple tooling
- Experience using sawing tools and disc sander
- Using MDF as a principal material
- Creating a vacuum formed mould
- Using concrete as a casting material
- Practical hands on experience using a vacuum forming machine, and understanding its wider application

Teachers notes:

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