



Spherical Lightshade

Completion time: 2 Lessons.

Materials and Resources:

- Sheet MDF, 1cm thickness
- Heat resistant bowl, putty or clay
- Drill and 1.5mm drill bit
- 6 paper fasteners
- Formech vacuum forming machine
- Suitable plastic material (1mm PC or PMMA, or other heat resistant material)
- <https://formechusa.com/case-studies/formech-indexlab>

Skills at a glance:

Mathematics

Measurement

Language

Listening skills, following instructions

Thinking Skills

Design, problem solving, mould selection, independent thought

Science

Heating plastics and effects, plastic/polymer material knowledge

Project Outline:

Students will very quickly create a spherical lightshade to be used on a hanging light in any room. Students will be using a simple heat resistant kitchen mixing bowl as their mold, producing two identical semi-spheres, which when attached to one another will make for a modern and sleek element of interior design. With no need to make a mold, students will learn how objects in the world around them can indeed be used as vacuum forming molds, further developing their understanding of the potential of the technology. Due to its simple nature this project can be executed in a very short space of time, yet create impressive and impactful results. Perfect for students in Art and Design classes, learning new skills to drive and inspire future projects.

Method:

Students will first need to prepare a vented MDF baseboard, upon which to mount their heatproof bowl over which they will vacuum form.

Taking a heat proof bowl that fits within the forming area of the Formech vacuum forming machine leaving a space of at least 2cm around its edge, this will require a number of venting holes applied around its top, middle, and base, 1.5mm in diameter.

Some bowls may have ribs on their bases, or flat bottoms. Features such as these will add interesting features to the finished lightshade, and will not necessarily be identifiable as elements of a bowl.

Placing the bowl upside down on the baseboard, students will observe that most bowls produce a very slight undercut where the bowl meets the baseboard. Using just a small amount of clay or putty, students must carefully fill this in, smoothing it flush as they go.

Students may create a path for the electrical cable to pass through the formed lightshade, allowing it to hang. This can be done by rolling clay or putty into a sausage shape, slightly wider than the electric cable. This should be placed with one end touching the point where the bowl meets the baseboard, with the other end heading away from the bowl. Imagine a magnifying glass, and the position of its handle in relation to the lens.

This bowl mold is now ready to be vacuum formed twice, using heat resistant plastic material. This may be clear, opaque, or colored, depending upon the wishes of the teacher or student.



Homework Tasks:

Interior Design is a field in which vacuum forming is used to both prototype and produce a wide range of products, from lighting, to seating, decorative panels and more. Students might conduct independent research at home, exploring a range of online furnishing shops and catalogues to observe products which they feel vacuum forming makes up part of their production. This will encourage students to think about the wider application of vacuum forming in this field, whilst also providing teachers the chance to observe the level of understanding for individuals and the class as a whole.

Optional Extras:

This project is relatively prescriptive, with no room to allow students to inject their own design ideas or artistic flare. Following on from this, students might take the skills, experience and knowledge gained in this simple and quick project, and create a lightshade of their own design, which celebrates ideas from their own imagination. Exploring new shapes, materials and themes, students can demonstrate their abilities to apply the principles of this project to a more creative and interesting lightshade.

Method: (Continued)

Between the two vacuum forming processes, the clay or putty material will most likely need to be applied again or neatened up.

Students will now have two identical vacuum formed plastic semi-spheres. These can have excess plastic material trimmed off in preparation for the final stages of production. When trimming, it is essential not to trim off excess material flush to the dome shape, rather students must leave a lip of 2cm all the way around the semi-sphere's edge. It is this lip which will allow the two semi-spheres to be joined together.

A series of holes can now be drilled around the 2cm lips on both formed pieces, through which paper fasteners can be passed, thus securing the domes together as a lightshade. Students must drill six holes all the way around the formed pieces circumferences; at twelve, two, four, six, eight, and ten o'clock positions. Ensure that the space for the electrical cable and all the holes align perfectly on both formed pieces.

The lightshade can now be hung, placing the two semi-spheres together to create a complete sphere, with the hanging lightbulb inside. Holes and cable space can be alligned, and the shade joined with paper fasteners. When gently left to hang, the entire lampshade will sit comfortably on the upper portion of the light fitting, not in contact or in close proximity to the bulb.

Student Accomplishments:

- The production of a professional lightshade
- Experience using physical objects as molds
- Experience using drilling equipment
- Experience using a band saw
- Following a prescriptive brief
- Applying a brief to wider applications
- Applied knowledge for the production of professional signage and lighting
- Practical hands on experience using a vacuum forming machine, and understanding its wider application

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