



## Ice Cube Tray

Completion time: 2 Lessons

### Materials and Resources:

- Pencil, paper, and a ruler
- Modelling clay, simple tools to add detail or texture to students molds, if desired
- Dish soap and washing facilities, freezer
- Formech vacuum forming machine
- Polyethylene terephthalate (PETG) 1.5mm sheet plastic (or other suitable food safe plastic)
- <https://formechusa.com/case-studies/formech-visited-techshop-san-francisco-ca>

### Skills at a glance:

#### Mathematics

Measurement

#### Language

Discussion, reading, listening

#### Thinking skills

Design and creativity, expression, interpreting a theme, applying a given brief, independent thought

#### Science

Heating plastics and effects, plastic/polymer material knowledge, temperature and effect on liquids, understanding of food safe plastics

### Project Outline:

Students are to design and create a custom ice cube tray, using clay as their mold material. Finished projects should have eight ice-cubes per tray. Designs might represent a theme or an upcoming holiday, or simply explore interesting shapes. Due to its simple and quick nature it also serves as a good introductory lesson to the use of vacuum forming for younger or less experienced learners. This project works well within a Home Economics, Food, Art, or Design class. The lesson can be extended or modified exploring different mold materials, tooling techniques, or themes.

### Method:

Students can begin by spending some time thinking about and sketching designs which they feel would be suitable ice cube shapes, considering ease of ice cube release from the formed tray in their design choices.

If students wish to add detail or texture to their designs, ensure that these are subtle to ensure a successful final product. During the design process teachers might draw upon aspects of the Formech Vacuum Forming Guide, and outline key considerations of mold design, such as draft angles, undercuts, and venting. Once a final design is produced, students may now mold and shape their clay, either by hand or using some simple tools, into eight individual and identical shapes.

The clay molds can now be allowed to dry completely, making them ready for the vacuum forming process. Place all eight ice cube molds into the vacuum forming machine, 1.5cm apart, and form using PETG, or any other food safe plastic material. Consider placing two or more students completed molds in the machine at the same time, to reduce the amount of plastic material used.

The clay molds can now be pushed or tapped out of the newly vacuum formed plastic, leaving students with their completed ice cube tray. Using suitable soap and hot water, wash the completed ice cube tray thoroughly, ensuring that there is no clay remaining in each individual ice cube recess.

The ice cube trays are now ready for use and can be filled with water and placed in the freezer, allowed to freeze, and the bespoke ice cubes enjoyed with a cold drink.

## Homework Tasks:

With students having been introduced to vacuum forming, teachers might ask them to conduct independent research as to its wider uses, highlighting that the production of simple ice cube trays is just one of thousands of applications. Using the Internet, students can find what they believe to be the most unusual and interesting use of vacuum forming. Returning to class they can present their findings to their peers, which allows scope to extend this project to cover research and presentation skills, and drawing upon skills and understanding gained during project completion.

## Optional Extras:

If teachers wish to reduce the length of this project from 2 lessons to just 1, we can explore the idea of students being inspired by the world around them, and use existing physical items as their vacuum forming molds. This removes the need to design a mold or use modeling clay material. For example, students may use six large nuts from within the workshop as their molds, or perhaps a long flat spanner or similar tool to vacuum form over, producing a larger ice cube design. This is a wonderful way to show the versatility of the vacuum forming process, to reduce lesson times, or to simply explore suitable and unsuitable mold shapes and materials. This method provides a platform for teachers and students to discuss pros and cons of certain shapes and materials in the vacuum forming process, for example items with undercuts, or made from delicate or non-heat resistant materials.

## Student Accomplishments:

- The production of a bespoke ice cube tray
- Experience using clay as a mold material
- Appropriate independent selection of other tools
- Discussions around food safe plastics
- Understanding of mold making principals and considerations
- Practical hands on experience using a vacuum forming machine, and understanding its wider application

## Teachers notes:

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