



How People Make Things

Rich Task Activity

Molding

This engaging rich task has been developed by the Education Department at the Children's Museum of Pittsburgh. Rich tasks are open-ended investigations designed for you to work alone or in a group and may be conducted during, before or after your visit to How People Make Things to enhance your experience.

Dental Stone Molding

Molding is adding a material to a mold to make a new shape. In manufacturing, many materials are molded like plastic and metal. Often molding requires a state change. A **state change** is when a material changes from a solid to a liquid or a liquid to a solid using heat.

In this activity, you will use **dental stone**, an inexpensive, non-toxic material similar to plaster, to create decorative keepsakes from candy molds.

Suggested Materials

- Dental stone, available from dental supply stores
- Shallow silicone chocolate molds
- Disposable cups
- Disposable spoons
- Water
- Paper towels
- Copy paper
- Scissors
- Thin Sharpie marker

Plaster can be used in place of dental stone, but it may be harmful to children

Task Tools

- An inquiring mind!

Procedures/Investigation

- Place two spoonfuls of dry dental stone in a disposable cup.
- Using the same spoon, carefully add one spoonful of water and stir. If necessary, add an additional small amount of water, but keep stirring until you've reached the consistency of toothpaste.
- Carefully pour or spoon the dental stone mixture into the candy mold. At this point, the dental stone is a liquid merely filling the shape of the plastic mold.
- Wait approximately 7 minutes for the dental stone to begin to firm.
- Cut a small slip of paper and write your name on it with the Sharpie. Place it on the still-wet dental stone to keep track of your decorative piece.
- As the material changes from a liquid to a solid, it will give off a small amount of heat. You may be able to feel this heat by placing your hand just above the candy mold.
- After 10-15 minutes, depending on the size of the mold, the dental stone will be solid. You'll notice the matte finish on the top of the material in the mold. Test the piece with a finger nail first – it should not dent or give in any way.
- Bend the edges of the silicone mold around the dental stone to remove the decorative piece. The mold itself can be washed and reused.

Teacher Hints

- Use rubber gloves and dust masks if dust is a concern.
- Review the following definitions:



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- A **solution** is created when 2 or more ingredients are dissolved to form something new that cannot easily be separated. The dental stone forms a **solution** after it has been mixed with water.
 - A **mixture** is created when 2 or more ingredients are combined to form one new substance, but each ingredient keeps its own properties (color, smell, texture) and it is easily separated...like salad dressing. Dental stone does NOT form a **mixture**.

Questions to Think About

- What would happen to the dental stone if you removed it from the mold before it had completed its state change?
- What kinds of products are manufactured in this way?
- How could you make this manufacturing process more efficient?

Ways to Extend Your Investigation

- Explore adding color or pigment to the dental stone. Dye can be difficult to incorporate when a state change is involved, so experiment with food coloring, paper tint, tempera or acrylic paint, or fabric dyes. Which works best for you?
- Use new silicone candy molds and melted chocolate to create edible molding experiments.
- Investigate how dentists use dental stone in their practice. What sort of practical application does the material have, and how might you use it in other industries?

International Technology Education Association Standards

- ITEA STL The Nature of Technology – 3. Understanding the relationship between technologies and the connection between technology and other fields of study.
- ITEA STL Technology and Society – 6. Understanding the role of society in the development and use of technology.
- ITEA STL Technology and Society – 7. Understanding the influence of technology on history.
- ITEA STL Design – 9. Understanding troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- ITEA STL Abilities for a Technological World – 13. Assess the impact of products and systems.
- ITEA STL The Designed World – 19. Understanding and selection and use of manufacturing technologies.

National Academic Standards

- NA-VA.K-4.1 Understanding and Applying Media, Techniques, and Processes.
- NA-VA.K-4.2 Using knowledge of Structures and Functions
- NA-VA.K-4.4 Making connections between visual art and other disciplines.

- NS.K-4.2 Physical Science
- NS.K-4.5 Science and Technology

- NPH-H.K-4.2 Health Information, Products, and Services.