



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.

Sidewalk Chalk

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, students will make sidewalk chalk by changing a powder to a liquid by adding water and observing it change into a solid when it dries.

Suggested Materials

- 1 cup of Plaster Paris
- ½ cup of water
- 2/3 teaspoon of tempera paint for color. (optional)
- cardboard tubes – for example, bathroom tissue tubes or pieces of lightweight cardboard rolled into a smaller diameter
Refer to Ways to Extend Your Investigation for other ideas.
- disposable container
- duct tape
- stirring spoon
- waxed paper

Task Tools

- Observation Page (see Rich Task Tool Sheet)
- An inquiring mind!

Procedures/Investigation

- Create a mold by covering one end of the cardboard tube with duct tape. To keep the plaster from sticking to the mold line the tube by loosely rolling up a piece of waxed paper and slipping it into the tube, or rolling your own cardboard cylinder.
- Mix 1 cup of Plaster Paris with 2-3 teaspoons of tempera paint in a disposable plastic container. Add water and mix well.
- Rinse the spoon under an outdoor faucet or in a jar filled with water to avoid clogging the sink drains.
- Pour the wet plaster into the mold. Lightly tap the sides of the tube to release air bubbles.
- Allow chalk to dry in the mold for 24 hours.
- Remove chalk from the mold and let it air dry for an additional 2-7 days depending on size.

Teacher Hints

- Ask if any one has ever molded before. Explain that most people have molded things. Give examples like making ice in an ice cube tray or making cupcakes in a cup cake tray.
- For pastel shades, combine white tempera with a primary hue.
- Smaller mold will allow the chalk to dry faster, less material is also used.



- Review the following definitions:
 - **Molding** happens when you add materials into a mold to make a new shape.
 - A **solution** is created when 2 or more ingredients are dissolved to form something new that cannot easily be separated.

Questions to Think About

- How is this project similar/different from the mass manufacturing of chalk.
- What kind of texture does the chalk have after it has hardened? (Hard, soft, brittle....)
- Would the chalk dry slower or faster in a different mold?
- Think about other household objects and speculate if the material underwent a state change during manufacturing.

Ways to Extend Your Investigation

- Try to swirl the tempera paint instead of mixing it fully for a different color effect.
- Try using different shapes as molds. (paper/plastic cups, plastic butter tubs, chocolate molds are some ideas)
- Think sidewalk chalk is just for kids? For inspiration, check out the works of pavement artist Julian Beaver whose work features reproducing well-known masterpieces as well as original artwork that tricks the eye with anamorphic illusion at: <http://users.skynet.be/J.Beever/index.html>
- Check out original works of master street painter Kurt Wenner at <http://www.kurtwenner.com/biography.htm>

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



How People Make Things Molding

Rich Task Tool Sheet

Sidewalk Chalk

1. Before you begin this activity, briefly describe each material. Include details such as texture and color:

Plaster Paris: _____

Water: _____

Tempera Paint: _____

2. Before you mix the water and Plaster Paris together, briefly describe what you think will happen:

3. Was your prediction accurate? What happened differently? What may have caused this?

4. Describe your sidewalk chalk. Include details such as shape, texture and color:

5. What could you and/or will you try the next time you make sidewalk chalk?
