raft®
RESOURCE AREA FOR TEACHING

STEAM
SCIENCE TECHNOLOGY ENGINEERING ARTS MATHEMATICS

LEARNING ACTIVITY

Instant Ice Sculptures

Make Ice Sculptures with Water

Can you believe that you can build an ice sculpture by pouring cold water on an ice cube? In this activity, students will learn more about matter and its physical changes.

Activity Challenge
Build an instant ice sculpture out of water.

Preparation

1. Review the materials needed list and gather materials.
2. Fill up plastic water bottle with tap water and seal it.
3. Put water bottle in the freezer for 2 hours. Set the timer.
4. Place bowl on baking sheet, topside down.

To Do

1. Take water bottle out of freezer after 2 hours.
2. Place ice cube on top of bowl.
3. Slowly pour water from the water bottle on top of the ice cube.

Observations
What is happening when the water is poured on the ice cube? How does temperature influence the success of this activity? Will the ice sculpture work without the ice cube? Why or why not?

Extensions

- Add food coloring to water to change the color of the ice sculpture.
- Try this activity using other liquids. How long will each liquid need to spend in the freezer before it has the same reaction?

The Science Behind the Activity
The temperature at which a liquid becomes a solid at normal atmospheric pressure is called its **freezing point**, which for water is 32° F (0° C). At this temperature liquid water usually transitions (changes phase) into ice, a solid. As liquid water turns into ice it expands, becoming less dense than liquid water. Filling a water bottle completely, sealing it with a cap, and putting it in a freezer prevents the water from expanding and increases the pressure inside the bottle. The increased pressure prevents the water from freezing at 32° F. Instead, after 2 hours the water is supercooled below its freezing point. In the activity, when the supercooled water is poured from the bottle it is no longer exposed to the excessive pressure. Pouring the water onto an ice cube at normal atmospheric pressure allows the water to crystalize and turn into solid ice at its normal freezing point without melting the ice cube. It freezes and accumulates, forming an ice sculpture.

Materials Needed

- ○ Plastic water bottle
- ○ Water
- ○ Ceramic or glass bowl
- ○ Baking sheet
- ○ Ice cube
- ○ Freezer
- ○ Timer

Grade Range
K-2
3-5

Topics/Skills
Science: Physical Reactions, Properties of Matter

Learning Standards
NGSS: Physical Science; Energy

Duration
20 minutes

Prep Time
2 hours