



## Curiosity Guide #602

### Bubble Science

Accompanies Curious Crew, Season 6, Episode 2 (#602)

#### Bubbly Fog

Investigation #2

#### Description

I tried to catch some fog earlier. I mist!

#### Materials

- Mixing bowl with a lip
- Dry ice, used with adult supervision
- Pliers
- Water
- Measuring cup
- Cotton fabric
- Scissors
- Soap
- Protective gloves
- Dish soap
- Bubble solution
- Bubble wand
- Goggles
- Two-liter bottle

#### Procedure

- 1) Put on safety goggles.
- 2) Pour water into a mixing bowl so the bowl is half full.
- 3) Cut a piece of fabric long enough to stretch over the width of the bowl.

- 4) Pour liquid soap into the measuring cup.
- 5) Place the cotton fabric in the measuring cup. Swish the fabric around until the fabric is fully saturated with the liquid soap.
- 6) Put on protective gloves.
- 7) Break off a section of dry ice. Drop the dry ice into the bowl of water.
- 8) What do you notice?
- 9) Stretch out the soapy fabric. Place the fabric along the top of one edge of the bowl.
- 10) Slowly drag the fabric across the bowl to leave a soap film on the top of the bowl.
- 11) What do you notice?
- 12) Try blowing a bubble on top of the fog.
- 13) What do you notice?

My Results

## Explanation

When the dry ice is submerged in water, the solid carbon dioxide sublimates into gas. At the same time, the water vapor that is already in the air around the bowl begins to condense and becomes visible fog. When the soap film covers the surface of the bowl, the air and fog particles push the film upward with an increased number of particle collisions. This makes a trapped dome of fog that suddenly bursts around the bowl. Blowing a bubble on top of the fog is interesting, because the bubble floats on the denser carbon-dioxide gas.

**Learn more.** Extend the experiment by cutting the top of a two-liter bottle. Combine and stir hot water and soap. Adding a small amount of dry ice will produce sudsy bubbles that when popped release the fog.

**Think about this.** When we think of bubbles, we often think of dunking a small wand into a solution. Then we blow through the wand to create a floating sphere. The solution is usually a kind of soap mixture, where the soap molecules sandwich on both sides of a layer of water molecules and trap a volume of air. The molecules attract to each other, creating a strong surface tension. The tails of the soap molecules are greasy, so the soap molecules don't evaporate. But as soon as that water begins to evaporate, or the bubble meets a dry object, the bubble will burst. Pop!

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