

## MYSTICAL BUBBLES | INSTRUCTOR NOTES



In this demonstration, bubbles are blown that are filled with white vapor that suggests a crystal ball. The “mystical bubbles” are created by funneling gas from dry ice through tubing to a small cup that has been dipped in bubble solution. The demonstrator or volunteers can attempt to catch and hold a bubble first with bare hands, then while wearing thin knit gloves moistened with bubble solution. Using the gloves, a bubble can be held for some time without breaking it.

In connection with an alchemy theme, the demonstrator can discuss what students know about alchemy already, particularly views of its mysterious and secretive aspects, and the types of lab environments where alchemists worked. The bubbles could be used as one example of how science could create a mystical atmosphere.

### MATERIALS

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- 2-liter beverage bottle
- Funnel
- Plastic tubing (~4–5 ft., with inner diameter fitting snugly over the tip of the funnel)
- Small plastic cup (e.g., condiment cup or bathroom cup)
- Sharp knife (e.g., utility knife or X-ACTO knife)
- Warm water
- Dry ice in insulated container
- Insulated gloves for handling dry ice
- Bubble solution
- Bowl or other open container to hold bubble solution
- Thin knit gloves

### SAFETY

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**SAFETY**

Goggles must be worn. The instructor should handle the dry ice only while wearing insulated gloves to avoid damage to skin. Do not store dry ice in a container that has an airtight seal. Pressure can build up and cause the container to explode.

## TIPS

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- The bubble solution can be made by the demonstrator or purchased ready-made. One bubble recipe site is <http://bubbleblowers.com/homemade.html>.
- Dry ice is available at some grocery and hardware stores.
- The dry ice may need to be broken into smaller pieces using a hammer. Pieces need to be able to fit through the opening cut in the top of the beverage bottle.
- You may wish to try to seal the space between the tube and the hole in the cup. One way could be to wrap a piece of a cotton ball around the tube, insert the tube into the hole, and then tape over the cotton ball and cup.

## PREPARATION

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1. Using a sharp knife, such as a utility knife or X-ACTO knife, cut off the top of the 2-liter beverage bottle. The hole should be slightly smaller than the large opening of the funnel. The large opening of the funnel will be placed upside-down over the opening cut in the top of the bottle.
2. Fit one end of the tubing snugly over the tip of the funnel.
3. Using the knife, cut a hole in the bottom of the small plastic cup and fit the other end of the tubing through it, so the tubing extends only a short way into the cup.

## DEMONSTRATION

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1. Pour bubble solution into a bowl or other open container.
2. Fill the 2-liter beverage bottle approximately half full with warm water.
3. While wearing insulated gloves, place a few chunks of dry ice into the beverage bottle.
4. Place the large opening of the funnel upside-down over the opening cut in the top of the bottle. Hold it firmly, so the majority of the carbon dioxide vapor travels through the tubing instead of leaking between the funnel and the bottle opening.
5. Dip the opening of the small cup into the bubble solution and then remove it from the solution. The carbon dioxide vapor coming through the tubing should “blow” a bubble through the bubble solution stretched across the opening of the cup.
6. Ask a volunteer to catch a bubble in his or her bare hands. Can he or she hold it, or does it break quickly?
7. Have the volunteer put on a pair of thin knit gloves and moisten the palms of the gloves with some bubble solution. Ask the volunteer to catch another bubble. Can he or she hold it, or does it break quickly?

## OBSERVATIONS AND EXPLANATION

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The solid dry ice changes state, sublimating into carbon dioxide gas. The gas fills the beverage bottle, creating a pressure that forces the gas, along with water vapor, out through the funnel and

tubing. It then pushes through the film of bubble solution stretched over the mouth of the small cup. The bubbles fill with a substance that looks like white vapor, giving them a mystical, crystal-ball-like appearance. Using the gloves moistened with bubble solution helps keep the film that makes up the bubble from breaking, prolonging the life of the bubble.

### DISCUSSION IDEAS

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1. What background knowledge do the students have about alchemy?
2. What are some adjectives to describe alchemists and their labs? What might a painting depicting an alchemist at work show?
3. How could the bubbles' appearance relate to alchemy?
4. Describe the states of matter present in the demonstration.

### EXTENTIONS

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Create a larger "crystal ball" using dry ice and water in a large bowl, by pulling a cloth strip soaked with bubble solution across the bowl's rim. (<http://www.stevespanglerscience.com/blog/2015/10/13/dry-ice-crystal-ball/>)

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Boo Bubbles – Dry Ice Science – Sick Science! #108  
<https://www.youtube.com/watch?v=MeUDny-5nPo>

(all URLs accessed January 2018)