

# Bottomless Bottle — A Demonstration of Pascal's Law

## Introduction

Use this old parlor trick to teach about the incompressibility of liquids and Pascal's law of equal pressure.

## Science Concepts

- Pascal's law
- Incompressibility of liquids

## Materials (for each demonstration)

Glass bottle\*  
 Glass disposal container  
 Gloves, cotton (long enough to provide lower arm protection)  
 Rubber mallet\*

Safety glasses  
 Safety shield (optional)  
 Transparent tape  
 Water

\*Materials included in kit.

## Safety Precautions

Use caution when striking the top of the glass bottle with a rubber mallet. Strike the top squarely so the lip of the bottle does not crack. If the lip cracks, but the bottle's bottom does not fall out—DO NOT hit the bottle again. Throw the bottle away and use a new bottle. Students observing the demonstration need to wear safety glasses. Students need to stand at least 10 feet away when the demonstration is performed. The bottle may crack in areas other than the bottom and broken glass may fly several feet from the demonstration site. Wear thick cotton or Playtex®-type latex gloves, a long-sleeved shirt or lab coat, and safety glasses. Practice this demonstration several times before performing in front of the class. A safety shield should be used if students do not have safety glasses available.

## Preparation

1. Obtain an empty glass bottle.
2. Wrap transparent tape around the bottom of the bottle and half-way up the bottle. See Figure 1. This will help contain any shattered glass once the bottom cracks out.
3. Fill the bottle about three-quarters to seven-eighths full with water so that the water level is in the bottle's neck just above the wider "body" area. See Figure 1. Add food dye if desired.
4. Allow the water to sit for a minute or two so that some of the trapped air can escape.

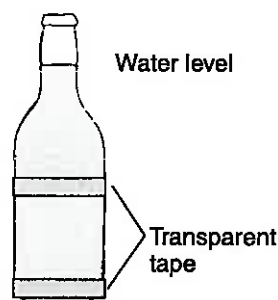


Figure 1.



Figure 2.

## Procedure

1. Obtain the rubber mallet, long cotton or Playtex-type gloves, safety glasses and the partially filled bottle.
2. Grip the neck of the bottle tightly with a gloved hand and hold it over a glass disposal container. *Caution:* Make sure everyone near the demonstration is wearing safety glasses!
3. Firmly strike the top opening of the bottle with the rubber mallet. Make sure the end of the rubber mallet strikes the opening squarely. See Figure 2. (*The bottom of the glass bottle should break and fall into the glass disposal container along with the water.*) *Caution:* If the bottom of the bottle does not "fall out" with the first blow, but the bottle's body or the lip cracks or chips—DO NOT strike the bottle again. Use a new bottle.