

BALLOON EARS

Source: Physics Teacher Larry Scheckl, Modified for the EAA

Concepts Illustrated:

- (1) Demonstrate Boyle's law, which is the relationship between pressure and volume. In this case, the volume will be increased inside of the two cups sealed by an expanding balloon, resulting in a decreased pressure inside the cups and the subsequent "suction" of the cups to the balloon.

Time Requirements: 5 minutes

Grade Level of Audience: This qualitative demonstration is suitable (and enjoyed) by students at all age levels.

I. Materials and Equipment Utilized

1. A 6"-8" round balloon
2. Two small plastic cups (I usually use 4-6 ounce cups)



II. Description of Set-up and/or Construction of Apparatus

1. Put about 1-2 ounces of water in each cup (if you are daring).
2. Partially blow up the round balloon. Press the openings of both cups against the balloon.



3. Proceed to fully inflate the balloons. You will now notice the cups appear to be attached to the balloon.



4. Tie off the end of the balloon. If is possible to gently wave the balloon, with cups of water attached, and the cups will not come off.

III. Details of Student Implementation

1. Ask students why the cups appear to be attached to the balloon.
2. The idea is that as the balloon inflates, it becomes less curved. As a result, the decreased curvature, increases the volume allowed for the air inside of the plastic cup, which reduces the pressure of this air. With a lesser pressure inside of the cup and a greater pressure outside of the cup, the cups are firmly pushed onto the balloon. Try to better explain the concept of suction as a greater pressure on one side of a fluid or surface against a lesser pressure on the other side of the fluid or surface, which results in a force directed from higher pressure to lower pressure. * Usually what we think of as suction involves atmospheric pressure as the higher side pressure.