FLYING COFFEE CUPS

Concepts Illustrated:

(1) The Bernoulli Effect

Time Requirements: 5 minutes

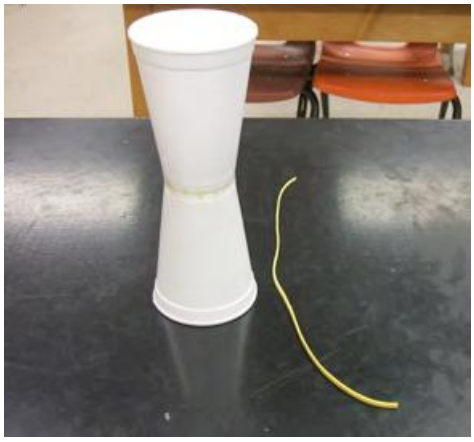
Grade Level of Audience: This qualitative demonstration is suitable (and enjoyed) by middle and high school students.

I. Materials and Equipment Utilized

1. Two Styrofoam cups
2. Glue and brick
3. Large rubber band
4. Scissors

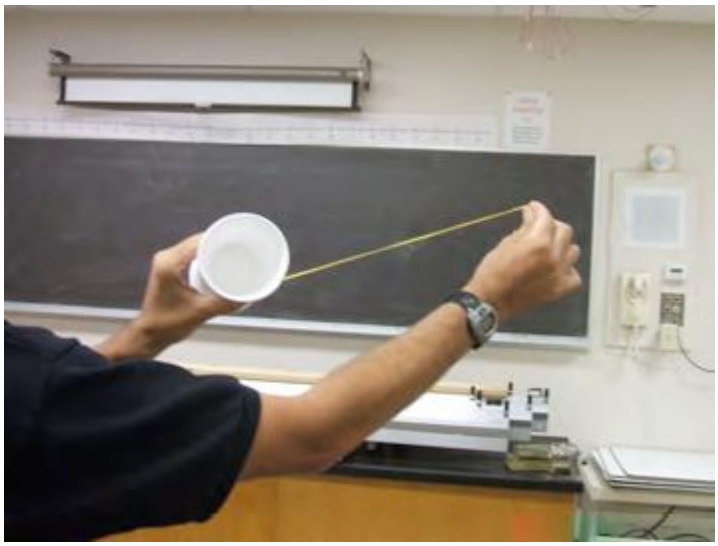
II. Description of Set-up and/or Construction of Apparatus

1. Glue two Styrofoam cups together as shown in the photograph below.
2. Place a brick on top of the cups until the glue dries.



3. Cut the large rubber band with scissors.

4. Tightly wrap the large rubber around the center of the cups. Grasp the cups with one hand and stretch the loose end of the rubber band with the other hand.
5. Aim slightly upward. When you release the cups, the stretched rubber band will give the cups some spin (rotation), which results in lift.



III. Details of Student Implementation

1. A pitched curved ball and a dimpled golf ball are examples of how the rotation can result in Bernoulli lift when the object is also translating through the air. In this case, the relative speed of the air moving over the top of the cups is greater than the relative speed of the air moving over the bottom of the cups, resulting in a net upward pressure.
2. In addition, the flying cups have built in stability due to the dihedral or upsweep of the wings.
3. Be careful not to aim this apparatus at other people.