# SCIENCE IN A PLASTIC CUP DEMOS
# for
# DISCREPANT EVENTS GALORE - AND MORE!

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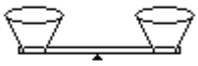
## Archimedes Principle *

Start with two plastic cups, one filled with water the other empty. Ask if the empty cup will float in the full cup? Have students make predictions then have them try it an make observations. Then pour 1/3 of the full cup into the empty cup and ask if the 1/3rd full cup will float in the 2/3rds full cup? Have students make predictions then have them try it an make observations. Finally ask the students if the 2/3rds full cup will float in the 1/3rd full cup? Have students make predictions then have them try it an make observations. Most will be quite surprised! The explanation is of course Archimedes Principle.

## Weighing a Thumb

This might also be known as Archimedes II. Set two cup about 2/3rds full on each end of a balance and adjust so that they are in equilibrium. Ask what will happen if I put my thumb into the glass of water on one side (being careful to touch only the water and not the cup)? Will the balance still be in equilibrium?



Of course the side that the thumb is stuck into will go down because the thumb is displacing water and therefore the balance assumes that more water is in the cup.

## Surface Tension *

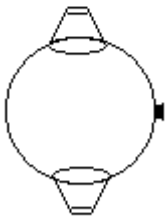
There are a million surface tension demos but this is my favorite. Pull the inside of a paperclip down to make an "L". Place a 1 yen piece on the horizontal portion of the paperclip then dip slowly into a cup ½ to 2/3rds filled with water. The coin will **NOT** float but will, instead, rest on the surface of the water. Careful observations will show that the coin has actually pushed the surface of the water down so that even the top of the coin is lower than the surrounding water. It can be demonstrated that the coin is not floating because if it is pushed through the surface of the water it will sink and not rise again. One yen coins are available from Educational Innovations Inc, on the web at www.teachersource.com .

## Refraction And Total Internal Reflection

Set a filled clear plastic cup on top of a small coin. Put a small square card just large enough to cover the top of the cup on top. It is still easy to see the coin. However, if the cup is fill to the top with water, the coin will not be visible when the card in on top of the cup.

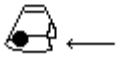
## Balloon Ears

Partially blow up a balloon. Gently hold a couple of plastic cups on the balloon and then finish blowing up the balloon. As the balloon gets larger less of it is inside the cup and therefore the pressure inside the cup drops. Atmospheric pressure then holds the cup to the surface of the balloon.



## Energy Slider

Cut a hole in one side of a cup and roll a marble into it. The distance it slides is proportional to the ball's kinetic energy ( $^1/_2mv^2$).



## String Telephone

Of course it is always easy to make a string telephone!

* Additional info on these demos and many others can be found under ICE Demos at physics.unco.edu/sced441

# RETINAL FATIGUE

Stare at the lower right star in the flag or the small cross in the center flower for about 30 seconds then quickly move to the bottom of the page.