The Hand in the Water Puzzle
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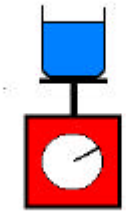
Description: This puzzle can be presented to your students for immediate consideration or as a homework assignment. After discussion of possible answers, the actual outcome of the puzzle can be demonstrated.

Topics: Buoyancy, density, critical thinking

Materials: One 2-Liter beaker.
One large kitchen scale
One hand

The Puzzle: A large beaker about three-fourths full of water is placed on the pan of a kitchen scale. The instructor lowers her hand into the water without touching the sides or the bottom of the beaker. The water level in the beaker rises.

The reading on the scale will: a) decrease b) remain the same c) increase.



Procedure: Add about 1200 ml of water to the beaker and place it on the pan of the scale. Present the question to the audience. Have the audience discuss the question. Take a vote on the three possible outcomes. Slowly lower your hand into the beaker without touching the glass. Observe the change on the weight reading.

Discussion: As you lower your hand into the water, it displaces a volume of water equal to the volume of your hand. Archimedes' Principle states that a force equal to the weight of water displaced will be exerted upward on your hand. Newton's Third Law of Motion says an equal force will be exerted downward on the pan of the balance causing the reading to increase. The increase is the same as if you poured a volume of water equal to the volume of your hand into the beaker.

Reference: *Mr. Wizard's World* television program on Nickelodeon Channel (ca.1980's).