

Educational Innovations^{INC}[®]

YEN-110

Floating Yen Coins

Demonstrate surface tension, buoyancy, and even eddy currents with these amazing coins!

Surface Tension: The yen coins are made of aluminum, which can float on the surface of the water, even though aluminum has a density of 2.7 gm/cm^3 , and the density of water is 1 g/cm^3 . Using a bent paper clip or a plastic fork, gently lower the flat side of the coin onto the surface of a pan of water and remove the clip or fork. The coin should rest on the surface of the water. Plastic cups, glass bowls or baking dishes with clear sides will make it easy to see the effects of surface tension. The coin will actually slightly depress the surface of the water and can easily be viewed through the side of the dish or pan.

Adding more than one coin to the pan will result in a cluster of coins forming. Since each coin depresses the surface of the water, they will tend to slowly float together and form a regular, crystalline structure. (Imagine bowling balls on a stretched bed sheet – they will slowly roll towards each other to form the most stable structure.)

Adding a few drops of soap, such as dish detergent, will break up the surface tension of the water and cause the coins to sink.

Buoyancy vs. Surface Tension: A charged rod will have different effects on floating objects, depending upon whether the object is floating due to surface tension or buoyancy (displaced water). A buoyant object will be attracted to a charged rod, while an object resting on the surface of the water will be repelled. Try charging a rod or piece of PVC pipe and bring it near to a floating aluminum coin – the coin will be repelled. To demonstrate a buoyant object being attracted to a charged rod, make a small boat out of aluminum foil and float it in the same pan as the coins. This boat will be attracted to a charged rod.

Eddy Currents: For this demonstration, you will need a strong magnet, such as one of Educational Innovations' neodymium magnets. First, demonstrate that the yen coin is not magnetic, by trying to pick it up or stick it to the magnet. Next, set the coin on a flat surface, so that it balances upright on its edge. Very quickly move the magnet back and forth over the top of the coin without touching it. The rapid movement of the magnet will induce an eddy current, which creates a temporary magnetic field in the coin. The magnetic field in the coin is attracted to the moving magnet above, causing the coin to move.



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