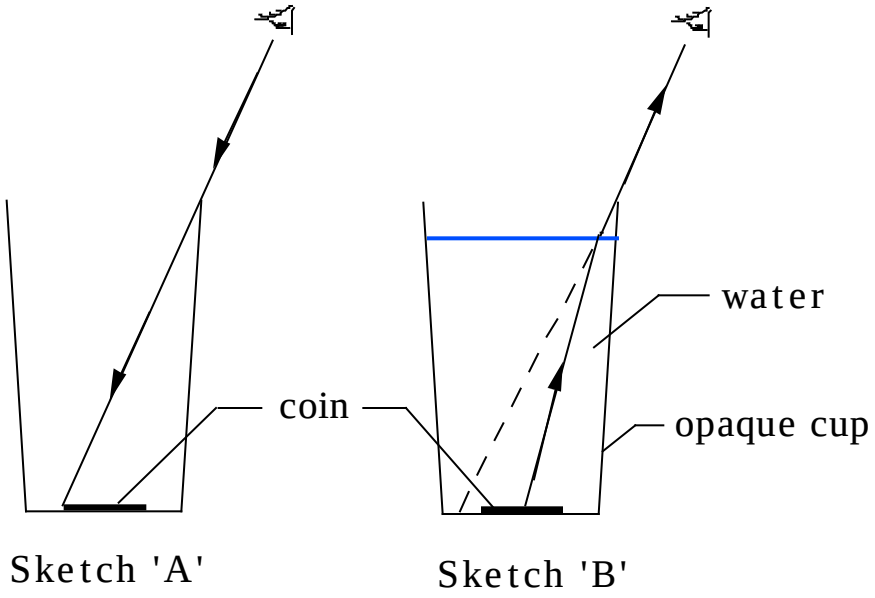
The Reappearing Coin

Materials: an opaque cup (foam or polystyrene), a coin (or any small object that sinks in water)

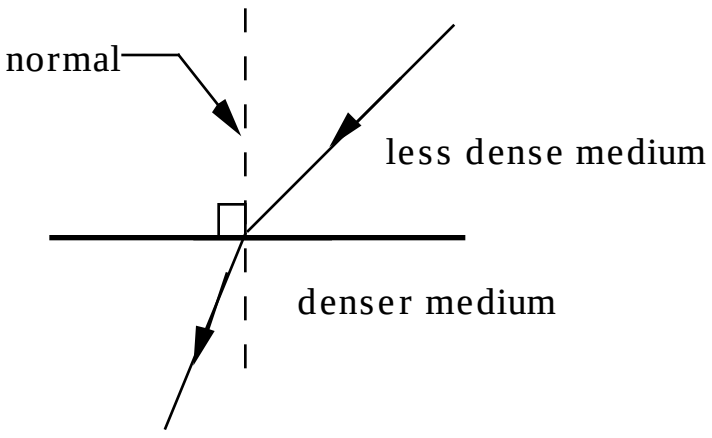


Procedure:

1. Let observers gather around the cup placed on a low stool.
2. Place a coin in the opaque cup and let the observers move their heads down from where they can see the coin, so that they just cannot see it (because it disappears behind the rim of the cup), and let them hold their eyes steady at the spot (Sketch A--the coin may be taped to the bottom of the cup, so it won't slide when the water is poured in).
3. Pour water into the cup until it is almost full: coin reappears!

Questions:

1. What made the coin disappear before the water was poured?
2. What made the coin reappear?
3. Did you have to move the position of your eyes to see the coin again?
4. What can you tell about the path of the light rays coming from the coin?
5. What other liquids can be used instead of water?



Explanation:

The eyes were positioned, such that the light rays coming from the coin were blocked by the rim of the cup. By adding water to the cup, these same light rays from the coin are now *refracted away from the normal*, as it travels from *denser* to *a less dense medium* (see Sketch B & C).

The *normal* is the line perpendicular to the surface separating the two media through which the light ray travels. Other liquids with high *refractive indices*, usually the denser ones, may replace water in this case.

This phenomenon is the reason why some deep waters seem to look shallow.