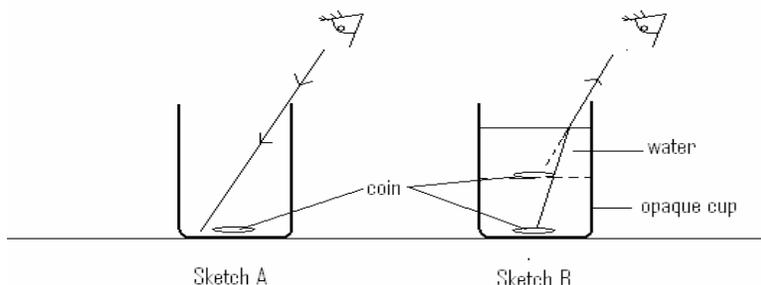


THE REAPPEARING COIN

A. Question: *Does the medium through which light travels affect the way light rays are refracted?*



B. Materials Needed:

1. An opaque cup (foam or polystyrene).
2. A coin (or any small object that sinks in water).

C: Procedure:

1. Let the students gather around the cup placed on a low stool.
2. Place a coin in the opaque cup and let the students 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 (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!

D: Anticipated Results:

Students be able to see the coin that was placed inside the cup after water is poured into the cup.

E: Thought Questions for Class Discussion:

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?

F: 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, now are **refracted away from the normal**, as it travels from a medium with larger to a medium with smaller refractive index.

The **normal** is the line perpendicular to the surface separating the two media through which 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.