



## THE DISAPPEARING COIN!

### EFFECT:

You place a coin on the table right in front of your friends. Then, while they continue to stare right at it, the coin disappears from sight!

### DESCRIPTION:

You take any standard coin and place it under a clear, empty drinking glass. The spectators can still see the coin clearly through the glass. Then you slowly pour normal water into the glass and as it fills up, the coin vanishes! The amazed audience can still see through the water and glass to where the coin used to be before it disappeared.

### HOW IT WORKS:

When light passes through different substances it can be bent around. This is because light travels at slightly different speeds in different substances. The coin under the glass will actually look a bit distorted because the light is refracted slightly when it goes from the air to the glass (and then from the glass to the air again). However, your audience is used to this because they see glass doing this all the time. Water does the same thing, which is why objects can look like they're bending as they enter into water.

The speed that light goes in water is different to air (which is called the water's "refractive index") and at the water-to-glass boundary the change in speed is so great that the light from the coin gets so refracted it actually looks like it bounced back off the glass and stays in the water. This is called "total internal

refraction" and means that none of the light from the coin escapes from the sides of the glass. The coin is there, but light from it can't get out of the glass!

### HINTS AND TIPS:

The light from the coin does eventually leave the glass. After it is totally internally refracted on the water-glass boundary, it then hits the top of the water and is refracted out of the water-air boundary. So if you look directly down, into the glass, you will once again see the coin. So you need to make sure your spectators are looking through the side of the glass.

For this reason it's best to use a tall glass with lots of water and have it as high as possible.

