Losing Your Marbles

Apparatus

clear glass marbles, clear liquid with same refractive index as the glass marbles, for example sugar or salt solution or alcohol solutions, two glass beakers

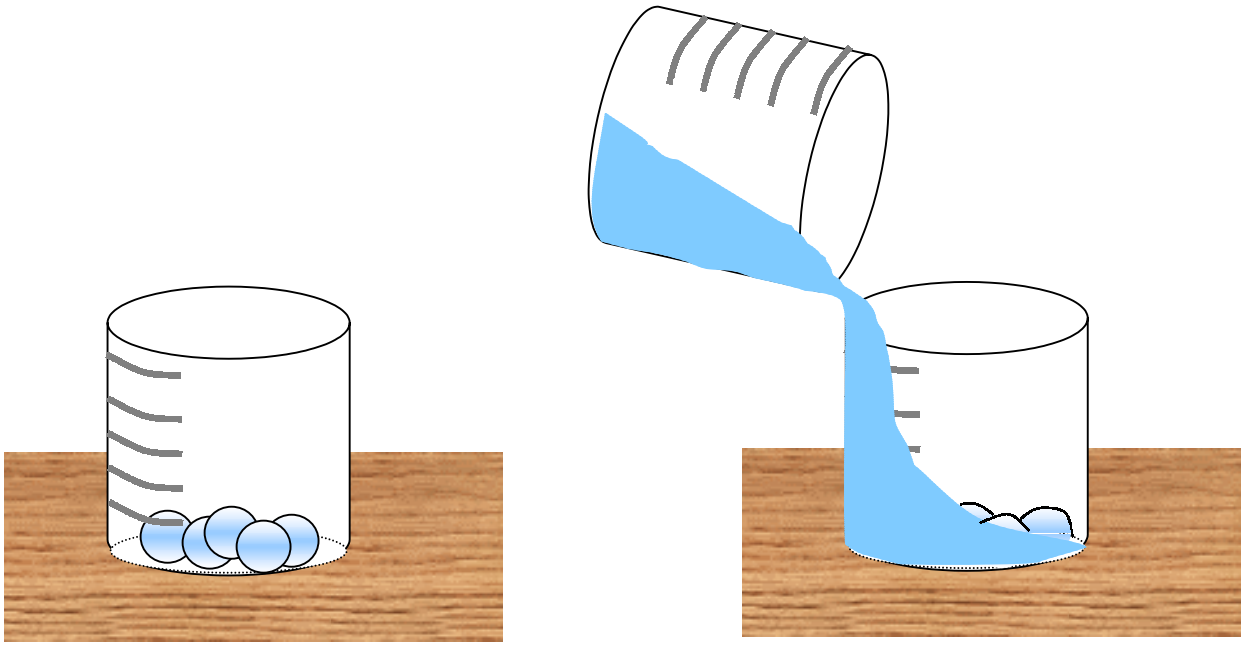
Action

The students observe the marbles in an otherwise empty beaker. They then pour the liquid into the beaker and explain why the marbles disappear.

The Physics

As long as the refractive index of the marbles and the liquid is the same, then light passing through the beaker will not be bent as it moves from water to marble to water again. If the marbles are transparent, they will be invisible in the liquid.

Note: There are many variations of this trick, for example hiding a whole test tube in a small tank of liquid, then dropping a broken one in and magically pulling it out good as new. These tricks make excellent lecture demonstrations, but broken glass should be avoided in tutorials.



Accompanying sheet

Losing Your Marbles

Pour the liquid into the container with the marbles in it.

Why do they appear to disappear?

What can you conclude about the refractive index of the marbles and the liquid?