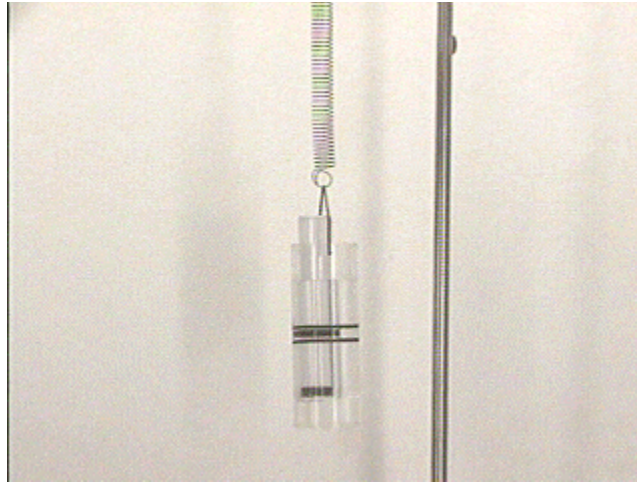


## Question #69

A container of water hangs from a spring, as seen in the photograph below.



In the container of water floats a vertical tube that has been weighted so that a line on the tube is just between two marker lines on the container. The center line in the picture is on the floater while the upper and lower lines are on the container. The container is raised up a few inches and released from rest, so it executes vertical simple harmonic motion on the spring. The question this week involves how the floater will move in the water as the entire system oscillates upward and downward.

There are three ways that the floater might move with respect to the water bath. It might move "*in phase*" with the motion of the container - that is, when the container moves **up** the floater might move **up** in the water so that its mark is above the lines on the container. On the other hand, it might move "*out of phase*" with the motion of the container - that is, when the container moves **up** the floater might move **down** in the water so that its mark is below the lines on the container. Or perhaps it will move in some way between these two extremes. Or perhaps it will not move at all, and will remain *at rest* with respect to the water in the container.

As the container executes vertical simple harmonic motion on the spring, the floater will undergo:

- (a) in phase motion with respect to the water.
- (b) out of phase motion with respect to the water.
- (c) some motion between these two extremes.
- (d) no motion at all with respect to the water surface.

Click here for [Answer #69](#) after June 18, 2001.

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For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](#) by e-mail or using phone number or regular mail address given on the [Lecture-Demonstration Home Page](#).