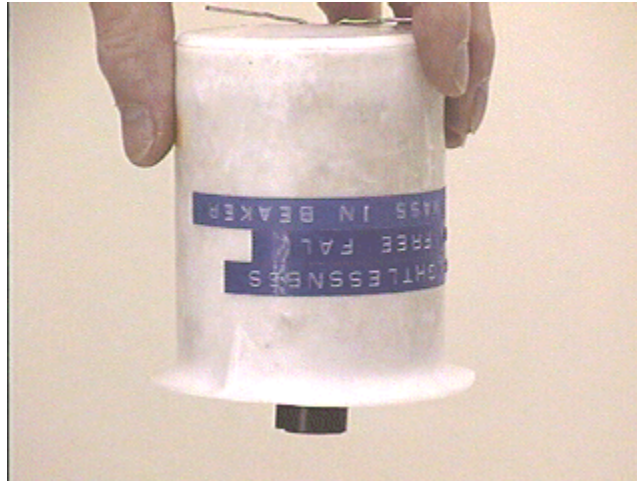


## Answer #103

The answer is (b): the mass will move up into the beaker immediately upon its release, as seen in an mpeg video by clicking your mouse on the photograph below. The video has been edited to move at one fifth speed to facilitate observation of the effect. Here is a video at [full speed but a bit blurry](#). You will have to view this one frame-by-frame.



When the beaker is released it begins to fall downward with the acceleration of gravity, a state described by physicists as "weightlessness in free fall," or "apparent weightlessness in free fall." The beaker is not actually weightless; its weight is the force that accelerates it downward. However, this means that for an observer in the frame of reference of the falling beaker everything appears weightless, so there is no longer any force pulling on the spring to extend it. The spring therefore pulls the mass into the beaker.

This is the reason why things "appear" weightless in satellites moving in earth orbit. Using a rocket they are given a velocity appropriate for a stable orbit at the desired height above the earth and parallel to the surface of the earth. The gravitational force then supplies the centripetal force necessary to cause the satellite to move in circles around the earth. This is equivalent to saying that the satellite is falling toward the center of the earth, so that in the frame of reference of the satellite everything is "weightless."

---

[Archive 6](#)

[Question of the Week](#)

[Outreach Index Page](#)

[Lecture-Demonstration Home Page](#)



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](#).