**Greek Waiter’s Tray**

 

**To Do and Notice**

1. Fill a glass half full with water and place it on the cardboard disk, our waiter’s tray.
2. Suspend the tray by holding the end of the three strings.
3. Swing the waiter's tray back and forth in an arc, starting out gently and working up to larger swings.
4. Continue to increase the swings until the waiter's tray moves in a full vertical circle (see drawing above).
5. Swing the waiter's tray in other directions for variety…like in a circle over your head!
6. Can you bring the tray and glass to rest without spilling the water?

**What’s Going On**

An object moving in a circle is constantly moving toward the center of its circular path. Another way to look at it, is that it is always “falling” inward. If the waiter’s tray is moving fast enough at the top of the circle, it will be falling toward the center at a rate greater than the acceleration of gravity. So, even though the cup is falling, the tray is actually falling faster, so the cup stays on the tray.

When the tray and cup are moving at other points in its circular path, the frictional force between the tray and bottom of the cup prevents the cup from sliding off the tray.