

# Floating Bottle Trick

Science and magic combine to produce the illusion of a real genie in a bottle... but the real secret is friction



The science magician displays a bottle and a short length of rope. They explain that ancient legends foretold of a genie in the bottle. While you can't see the genie, if you tickle him with something like a rope, it makes him mad and he hangs onto the offending item. The rope is inserted into the bottle and jiggled a bit. When the bottle with the rope still inside it is turned upside down, the rope is seen dangling, unsupported from the bottle. The magician explains that the genie is even strong enough to make the bottle float. The audience is amazed by the illusion, not knowing that the secret is a tiny ball hidden inside!

## Here's What You'll Need

- 1 Clear Glass Bottle
- 1 Solid Colored Bottle
- Aluminum Foil or a Small Ball
- Rope

## Let's Try It

1

If you are using foil, crumple it up to create a small ball that fits inside the mouth of your bottle.

2

Hide the small ball or foil ball in your hand. Your hand should be held naturally so no one can tell you are hiding anything.

3

Have a friend select one of the soda bottles and one of the ropes, you take the other of each.

Ask your friend to inspect the bottle to make sure it is a normal bottle. While they are doing that, you do the same. Turn the bottle upside down and secretly place the ball that has been hidden in your hand at the opening of the bottle. As you turn the bottle over, the ball should fall inside to the bottom of the bottle. Make sure you have a hand holding the bottle near the bottom to help hide the ball inside.

5

Both you and your friend should put your ropes halfway into the bottle to “tickle the genie.” Turn your bottles upside down and tug a little on the rope. As you let go, the rope in your bottle will stay in place, while your friend's rope will fall out.

6

Now turn your bottle right side up and let it dangle as you hold onto the rope. At this point, your friend will still be trying to get the rope to suspend from the bottle. Working over a soft or carpeted surface might be a good idea.

7

Push the rope into your bottle to release the ball and remove the rope. Grabbing the bottle by the neck, turn it upside down to secretly drop the ball back into your hand. Offer to trade bottles and ropes with your friend since you have proven yours works. Remember to steal the ball without them seeing!

8

Switch bottles with your friend and repeat the process of sneaking the ball inside the bottle, putting the rope halfway inside, and allowing the bottle to hang from the rope. Your friend will be amazed at your magical powers!



## How Does It Work

Friction makes this effect work. Friction is the force or resistance that fights against the movement of one object or surface against another object or surface. The surface of the ball (the “genie”) provides adequate force or resistance to bind the rope against the glass and keeps the rope from slipping out of the bottle.

On a very tiny level (microscopic, in fact), the fibers of the rope are grabbed by the rough surface of the ball on one side and the rough surface of the glass on the other. This resistance stops the rope from moving. At the same time, the surfaces of the ball and the glass are binding each other to hold the ball firmly in place. When you push the rope downward slightly, the resistance is removed, the ball drops into the bottle, and the rope can be easily taken out of the bottle.



## Take It Further

Now that you have mastered the Floating Bottle Trick, try different ways to experiment with it. Are there other objects that you can use instead of the small ball that create more friction? How about something to replace the rope? Just remember that the bottles you are using are made of glass, so we recommend trying this over a bed or close to the carpet so if the bottle falls, it doesn't break!



## Science Fair Connection

Performing the Floating Bottle Trick is pretty cool, but it isn't a science fair project. You can create a science fair project by identifying a variable, or something that changes, in this experiment. Let's take a look at some of the variable options that might work:

- Try testing how strong the friction of the rope is in comparison with other materials (nylon vs cotton). Slowly add weight to the bottle until the rope (or other material) slides out of the bottle. Document your findings.
- Instead of changing out the rope, do the same test by trying different balls.

That's just a couple of ideas, but you aren't limited to those! Try coming up with different ideas of variables and give them a try. Remember, you can only change one thing at a time. If you are testing different ropes, make sure that the other factors are remaining the same!

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