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Vanishing Jelly Marbles

Clear sphere polymers that vanish like magic in a glass of water

It looks like an ordinary glass of water... crystal clear water. But hiding just below the surface of the water are an amazing collection of large, jelly-like marbles that become invisible when submerged in water. The Jelly Marbles become invisible due to an identical index of refraction with the liquid. In other words, they vanish like magic! As you'll see, there's more to this experiment than meets the eye.



Materials

- Clear Spheres - Jelly Marbles
- Plastic cup
- Clear glass bowl
- Water

Jelly Marbles start out as hard crystals, but when you drop them in water, they expand by absorbing 300 times their weight in water.

1. Fill the plastic cup 3/4 full with warm water (warmer water helps to speed up the absorbing process).
2. Measure approximately one teaspoon of tiny Jelly Marbles into the water.
3. Allow the spheres to soak for at least three hours, but don't be afraid to pull a few out with a spoon every so often to check on their progress. Make sure to notice the changes in shape and size. As they grow, the spheres will take some very unique shapes along the way, but they'll eventually take on the shape of a clear sphere. The Jelly Marbles should reach their maximum growth at 5-6 hours, but leaving them overnight is even better. Pour off any excess water and you'll be left with a glass filled with clear marbles.
4. Here comes the fun part... Fill the clear glass bowl half full with water and drop the water-filled Jelly Marbles into the water one at a time. The spheres will vanish as they hit the water. When you're finished, you'll have what looks like a bowl of water. Reach into the water and gently remove a handful of Jelly Marbles. From this point on, it's impossible to keep your hands out of the bowl of water!

Another way to present this demonstration is to start by showing a bowl or a glass filled with the hydrated Jelly Marbles. Slowly fill the glass with water (you won't need much) and the Jelly Marbles seem to vanish.

You can also use the Jelly Marbles to reveal a hidden message. You'll need a glass pie pan or a shallow glass dish of water for this trick. Write the message that you want to appear on a piece of white paper, and place the dish on top of the message. Fill the dish with a layer or two of the hydrated Jelly Marbles. You will not be able to read the message because the refracted light breaks up the letter. When you want the message to appear, pour water slowly into the dish to cover all of the spheres. As the Jelly Marbles vanish, the message appears.

How does it work?

Jelly Marbles are actually made from a superabsorbent polymer that absorbs 300 times its weight in water. These hydrophillic spheres are approximately 99% water. If you look closely, you can barely see the outline of the sphere in the bowl of water. That's because light passing through the sphere is only refracted (or bent) by the edge of the sphere. Without this refraction along the edges, the Jelly Marbles would seem to vanish altogether. In other words, the water-filled Jelly Marbles become invisible due to an identical index of refraction with the water in the bowl. The secret is to keep the Jelly Marbles clean and free of oil from your skin. The more you touch the spheres, the less invisible they become because dirt and oil on your fingers is transferred to the surface of the sphere, which also reflects the light to reveal the sphere.

In the hidden message demonstration, the message looks scrambled because the rays of light are scattered by the water-filled Jelly Marbles. It's like trying to look through broken glass. When water is added to the dish, the light rays pass right through the water and the spheres without being scattered - due to the Jelly Marble's identical index of refraction with the water. So, it looks like you're looking through a plain dish of water.



Water Jelly Crystals



Water Absorbing Crystals