

Cyclone in a Bottle!

Buckle up, storm chasers — we're about to trap a tornado in our hands!

Why does the water spin into a swirling cyclone instead of just glugging straight down? What's really happening inside that whirlpool? Let's find out what happens when science takes a spin — using nothing more than water, two bottles, and a twist of the wrist!



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"Before we start — what do YOU think will happen when you flip the bottles? Will the water glug slowly, gush out all at once, or spin into a tornado?"



What You Need

- 2 clear plastic bottles (1.25 L or 2 L PET)
- Bottle connector or strong tape
- Water (fill one bottle nearly to the top)
- Optional: glitter or food colouring

Try It Another Way!

"Swap the water for liquids of different thicknesses — like juice, oil, or syrup — and see how your cyclone spins!"

Need a connector?

Check them out in our online store.

Step-by-Step:

1. Fill It Up!

Fill one bottle about half-way with water. Add a drop of food colouring or a pinch of glitter if you want extra "storm sparkle."

2. Connect the Bottles

Place the washer over the mouth of the filled bottle, then screw on the connector. Attach the empty bottle to the other end. If you don't have a connector, use strong tape to seal the bottles tightly.

3. Flip the Storm

Hold the bottles with the full one on top. Flip them so the water-filled bottle is now upside down over the empty one.

4. Spin the Cyclone

Give the top bottle a quick, smooth swirl in a circle. Watch as a swirling cyclone forms, racing the water down!

5. Time the Twister

See how long it takes for all the water to drain. Try it again with a faster or slower swirl — does it change the speed of your cyclone?



What's going On?

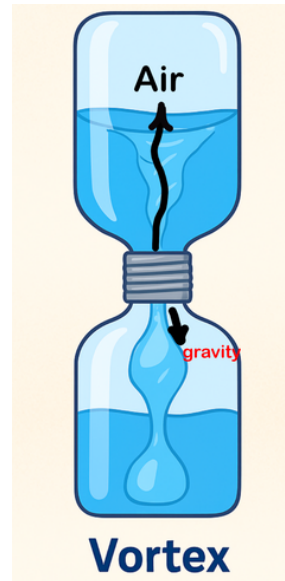


The key idea here is that air takes up space!

In the lower bottle, the air has nowhere to go – it's blocking the water from flowing down. The air in the bottom bottle pushes upward while gravity pulls the water in the top bottle downward. It's a traffic jam between air and water.

When you spin the bottle to make a vortex, the water swirls to the sides, leaving an open tunnel in the middle. This tunnel gives the trapped air a clear path to move up into the top bottle while the heavier water flows smoothly down into the bottom bottle.

It's all about air pressure and flow paths.



Two Ways Water Flows Between Bottles

Glug-Glug Flow

Water drops in bursts because air can only bubble up through tiny gaps. This makes the water “glug” and slows it down.

Vortex Flow

Spinning the bottle makes the water swirl to the sides, leaving a tunnel in the middle for air to rise. Water and air swap places smoothly, so it drains faster.

Glug-Glug Flow



Vortex Flow



Try different amounts of water in the top bottle (full, half, quarter) and measure how long it takes to empty each time. Which drains fastest?

Use a phone or tablet to film the vortex in slow motion. Watch closely to see how the air tunnel forms and changes as the water drains.

Design and build your own connector for the bottles using cardboard, tape, or recycled materials. Test if different connector shapes change the vortex speed.

Create a comic strip or animation of a “vortex adventure,” giving the water and air characters personalities as they race to swap places..

Time how long the vortex takes to empty for different water levels or spin speeds. Graph your results to find the fastest combination.