

TORNADOS!

"This room looks like a tornado hit it!"

The next time you have to say that to your children, follow it up with this...

"If you clean it up, we can go to the kitchen and make our very own tornado!"

What you need:

Two empty 2 liter soda bottles; Electrical tape; Water; Vegetable oil, food coloring, lamp oil* or glitter (optional)

Directions:

Fill one soda bottle 2/3 full with water. Place the second bottle upside down and on top of the first bottle, and secure the openings with the electrical tape.

Now turn the bottles over and place the empty bottle on the bottom. What happens? Why doesn't the water begin to flow down from the top bottle? *Even though the bottom bottle appears empty, it is really filled with air. Since air occupies space in the lower bottle, the water cannot flow into the bottom bottle unless the air has somewhere to go.*

Now swirl the top bottle in a circular motion. What happens? Why does the water now flow? *Gravity will force the water in the top bottle to flow down into the bottom bottle and a tornado, or vortex, will be formed with an air hole in the middle. The air from the bottom bottle is able to flow upward into this hole, through the vortex, and into the top bottle.*



Take it to the next level!

Make a second set of bottles and have a race! Experiment with the amount of water added. What amount of water will create the fastest tornado?

Add a tablespoon of vegetable oil, and some food coloring or glitter. What happens? How is this vortex different than the vortex that appears when you just use water?

Add a tablespoon of lamp oil (found in crafts supply stores or seasonally at the grocery store) and some food coloring or glitter. What happens? How is this vortex different? Are the liquids mixed when they reach the bottom bottle?



Extend Your Learning:

A vortex is a type of motion that causes liquids and gases to travel in spirals around a centerline. A vortex can be created when a rotating liquid falls through an opening. Gravity is the force that pulls the liquid into the hole and a continuous vortex develops. You can see a vortex form over the drain when you let the water out of a bathtub. A vortex can also form behind a blunt object sitting in a stream of flowing water - this is often called a whirlpool. A "dust devil" is also a vortex. Leaves or dust blowing around in a circle for a few seconds have formed a vortex.

**Lamp oil has about the same viscosity as water. Lamp oil does not stop the flow of the vortex, instead the molecules of water and lamp oil spin at the same rate, and the less dense lamp oil is drawn toward the center of the vortex.*