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**Science Kids**

**Science Experiments for Kids**



## Make a Tornado in a Bottle

Learn how to make a tornado in a bottle with this fun science experiment for kids. Using easy to find items such as dish washing liquid, water, glitter, and a bottle you can make your own mini tornado that's a lot safer than one you might see on the weather channel. Follow the instructions and enjoy the cool water vortex you create!

### What you'll need:

- Water
- A clear plastic bottle with a cap (that won't leak)
- Glitter
- Dish washing liquid

### Instructions:

1. Fill the plastic bottle with water until it reaches around three quarters full.
2. Add a few drops of dish washing liquid.
3. Sprinkle in a few pinches of glitter (this will make your tornado easier to see).
4. Put the cap on tightly.
5. Turn the bottle upside down and hold it by the neck. Quickly spin the bottle in a circular motion for a few seconds, stop and look inside to see if you can see a mini tornado forming in the water. You might need to try it a few times before you get it working properly.

### What's happening?

Spinning the bottle in a circular motion creates a water vortex that looks like a mini tornado. The water is rapidly spinning around the center of the vortex due to centrifugal force (an inward force directing an object or fluid such as water towards the center of its circular path). Vortexes found in nature include tornadoes, hurricanes and waterspouts (a tornado that forms over water).

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# Tornado In A Bottle

Student Sheet(s)

## Background Information

Wind speeds in tornadoes range from values below that of hurricane speeds to more than 300 miles per hour. Unlike hurricanes, which produce high speed winds over large areas, the maximum winds in tornadoes are often confined to extremely small areas. They change greatly over very short distances, even within the funnel itself. The tales of complete destruction of one house next to one that is totally undamaged are true!



In 1971, Dr. T. Theodore Fujita of the University of Chicago devised a six-category scale to classify U.S. tornadoes. The six categories are named F0-F5. These categories are based upon the estimated maximum winds occurring within the funnel. The Fujita Tornado Scale (or the "F Scale") has become the standard scale for estimating wind speeds within tornadoes based upon the damage done to buildings and trees. In fact, all tornadoes are now assigned an F scale. It is used by the National Weather Service and engineers to investigate the damage and structure of tornadoes.

Today's activity will have you building a tornado simulator. This simulator will show the basic characteristics of a tornado. To see it better, you will use water, instead of air, for your tornado. Tornadoes are called vortices based on their properties. Once you have started it, the water will exit through the hole forming a vortex, similar to a tornado. To see it even better, you can add oil, food coloring, or confetti to the water.



## Materials

- Two 2-liter bottles
- Tornado cap
- Water
- Food coloring
- Glitter or plastic confetti
- Lamp oil (optional)
- Funnel

## Procedure

1. Be sure your group has two 2-liter bottles and the tornado cap.





2. Choose one of the 2-liters. Fill it three-fourths full of water (does not have to be exact).
3. Screw the tornado cap onto the top of the 2-liter bottle.
4. Screw the empty 2-liter bottle to the top of the tornado cap. Your set-up should look like the figure on the right.
5. Quickly, but carefully, flip the two 2-liter bottles over, so that the empty one is one the bottom.
6. Grabbing the top of the tornado simulator, swirl it around to start it.
7. Answer these two questions, and record other observations on the line below:
  - a. What is happening to the water as it leaves the upper 2-liter bottle?
  - b. What is happening to the water as it enters the lower 2-liter bottle?
8. Repeat the experiment again. Did you observe the same things? Record any differences here: \_\_\_\_\_
9. With the full 2-liter bottle on the bottom, remove the upper 2-liter bottle and the tornado cap.
10. Add oil, food coloring, or confetti (whatever your teacher provides) to the water. Use the funnel to prevent spilling it.
11. Attach the tornado cap and empty 2-liter bottle back on top.
12. Repeat the experiment.
13. Record your new observations:
  - a. Can you see what is happening better now?
  - b. If you used the oil, what happened to it during the tornado?
  - c. If you used confetti, what happened to it during the tornado?
  - d. Note any new observations: \_\_\_\_\_

