

# Can You Make a Tornado in a Bottle?

**Estimated Time:**

**Prep:** 10 min.

**Activity:** 20 min.

## Introduction

### Overview

**Experiment:** Students create a **swirling “tornado”** of water in a bottle, comparing the movement of the water to that of the air in a real tornado.

**Key Concepts:** Students will gain an understanding of how tornadoes behave.

### Lead-In

Introduce the concept of **severe weather**—weather that can harm people and their surroundings. Ask students to brainstorm some examples of severe weather. **Meteorologists** (scientists who study weather) watch weather patterns closely and warn people when dangerous storms are approaching so they can be prepared.

One kind of severe storm is a **tornado**. A tornado is a fast-spinning, **funnel-shaped** cloud. It begins in a cloud and can reach all the way to the ground. Tornado winds can blow up to 300 miles per hour! A strong tornado can pick up cars and trucks and destroy buildings.

Show some pictures of tornadoes, pointing out the empty space in the center of the funnel cloud. Explain that the swirling of the winds creates a **vortex**, or a whirling mass of air around a calm center.

## Teacher Preparation

### Lead-In Materials:

- Pictures of tornadoes

### Teacher-Provided Experiment Materials:

- 2 clear plastic two-liter bottles
- Tape (electrician’s tape works best)
- 3–5 drops of clear dish soap
- Water
- Glitter
- Small crumpled pieces of aluminum foil (no larger than  $\frac{3}{8}$ " in diameter)

### Prepare:

- Make copies of the Experiment Sheet.

**Note:** Some leakage may occur when the bottles are turned over. Be sure to perform the experiment in a water-safe location.

## Vocabulary

- ◆ **funnel** a cone shape that narrows to a small tube at the bottom
- ◆ **meteorologist** a scientist who studies the weather
- ◆ **severe weather** weather that can cause serious harm
- ◆ **swirl** to spin in circles
- ◆ **tornado** a violent, spinning storm
- ◆ **vortex** a mass of spinning air, liquid, etc., that pulls things into its center



## You Will Need



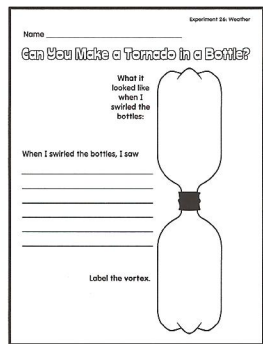
blue food coloring



magnifier

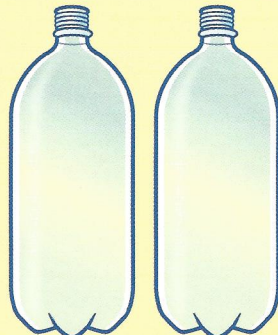


one-inch metal washer



Experiment Sheet

### Teacher-Provided Materials



2 clear plastic two-liter bottles



glitter



electrical tape



small crumpled pieces of aluminum foil (marble size)



water



3-5 drops of clear dish soap

## Procedure

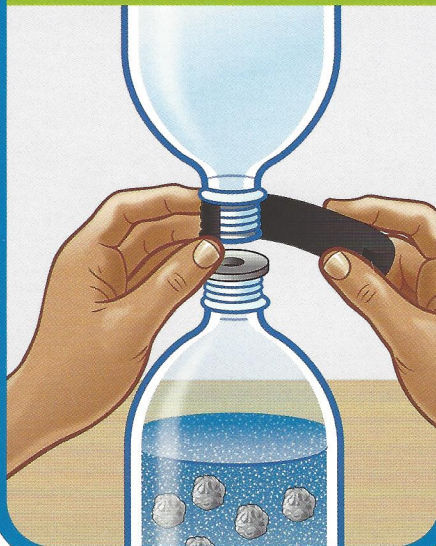
1

Pour water into one of the bottles until it is three-quarters full. Add three drops of food coloring, some glitter, the aluminum-foil pieces, and dish soap.



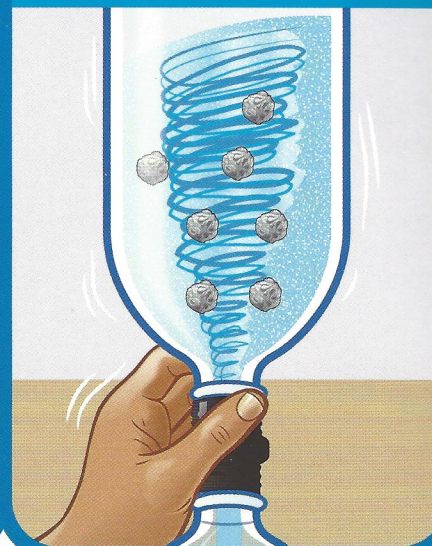
2

Place the washer on top of the bottle. Have an adult use tape to attach it tightly to the other bottle. Turn the bottles over.



3

Swirl the bottles in a circular motion. Observe what happens. Use a magnifier for a closer look. Record your observations.





Name \_\_\_\_\_

# Can You Make a Tornado in a Bottle?

What it  
looked like  
when I  
swirled the  
bottles:

When I swirled the bottles, I saw

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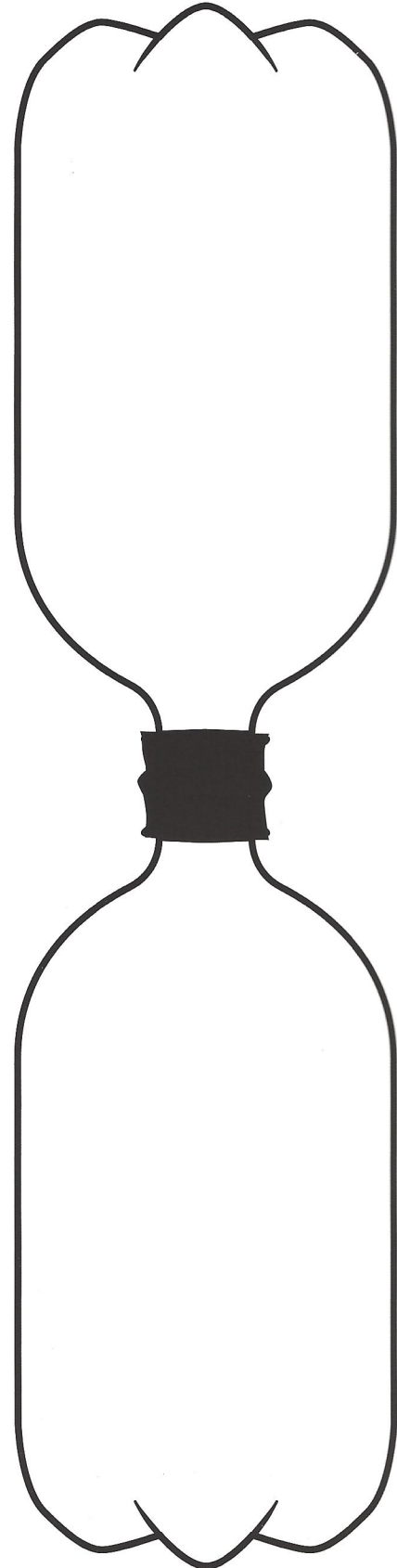
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Label the vortex.





## Why?

The powerful spinning storms known as tornadoes can be hundreds of feet wide. They have the strongest winds on Earth—up to 300 miles per hour! Fortunately, most last only a few minutes. Tornadoes usually occur in spring and summer, during thunderstorms. Water and debris swirling in the wind make the characteristic funnel-shaped cloud easy to see. Tornadoes are most common in Florida and the area of the Great Plains known as “Tornado Alley,” but they can happen anywhere.



## Discussion Prompts & Questions

- What happens when you swirl the bottles faster?
- Why did we put blue food coloring and glitter in one of the bottles?
- Does the vortex always look the same? What do you think makes it behave differently?
- What happened to the glitter and foil in the bottle?



## Sentence Frames

- As I began to move the bottles in circles, I observed \_\_\_\_\_.
- After swirling the bottles a little more, I observed \_\_\_\_\_.
- The water moves \_\_\_\_\_ (*upward or downward*) in a \_\_\_\_\_ motion.



## Try This!

Encourage students to look for examples of “tornadoes” at home, such as what forms when water drains from a sink or bathtub. Which direction does the water turn—clockwise or counterclockwise? Can you make it turn the other way? What happens if you interrupt the water going down the drain by blocking the drain with your hand? Does the vortex form again after you move your hand away?