

TORNADO IN A BOTTLE

LESSON OVERVIEW: THE PRIMARY PRINCIPLE ADDRESSED IS ENERGY TRANSFER. STUDENTS WILL LEARN THE FORCES THAT HELP CAUSE TORNADOES. STUDENTS WILL ALSO LEARN PRACTICAL METHODS OF DEALING WITH TORNADOES AND OTHER NATURAL DISASTERS.

SCIENCE STANDARDS

Force & Motion: Standard 1

The student understands that types of motion may be described, measured and predicted. (SC.C.1.2.1)

Force & Motion: Standard 2

The student understands that the type of force that acts on an object and the effect of that force can be described, measured and predicted. (SC.C.2.2; SC.C.1.2.4)

Nature of Science: Standard 1

The student uses the scientific processes and habits of mind to solve problems. (SC.H.1.2.5)

Materials:

Two empty, 2-liter plastic bottles, water, duct tape, optional: dish detergent, food coloring, silver glitter

Procedures:

1. Remove tops and labels from the bottles.
2. Fill one of the bottles with water to within 3 inches from the top.
3. Add: 2 drops of dish detergent, a drop of food coloring, 1 tsp. silver glitter.
4. Place the empty bottle upside down on the water-filled bottle. (Open ends should make contact.)
5. Seal the bottle together with the duct tape.
6. Turn the bottles over. If they leak use more duct tape.
7. Invert the bottles until a tornado forms. (You may need to rotate the water-filled bottle to start the tornado by putting your hand on the top bottle and rotating.)

Wrap-up:

1. Discuss with students the definition of a vortex (spinning column of air with some water vapor).
2. Why does the vortex form?
3. How can you change the size, shape, and duration of the vortex? Try hot vs. cold water; increasing or decreasing pressure in the bottle (squeezing the bottle); changing the amount of water; changing the liquid in the bottle.
4. What happens if you let the water drip WITHOUT rotating the bottle?
5. What does this have to do with twisters?

After the Thrill:

Experience TWISTER... Ride it Out® at Universal Studios Florida®. Discuss the differences between the ride and a real tornado. Have students write a 5 paragraph essay on how they could prepare for a real tornado.

Have students visit the American Red Cross website at www.redcross.org. Using this website, have them prepare a home tornado plan and assemble a list of items to put in a Disaster Supply Kit.

Note: If you are discussing Tornadoes in the context of Natural Disasters, you can also visit the attraction Earthquake®—The Big One, paying special attention to the pre-show, and discuss the cause and effect of Earthquakes. Discussion points can include the following: What causes earthquakes? What is the Richter scale? What can you do in case of an earthquake? Why don't they occur in certain states such as Florida?