

# Thunderstorms

## Learning Activity 1

### 1. Updrafts in Action

**Objective:**

Demonstrate the ability of the wind to suspend rain and hail in clouds.

**Overview:**

You will suspend a ping pong ball in the stream of air supplied by a hair dryer demonstrating how hail is supported in thunderstorms.

**Total Time:**

10 minutes

**Supplies:**

Hand held hair dryer and at least two ping pong balls.

**Procedure:**

Point the nozzle of the hair drier up and turn the power on HI. Place the ping pong ball in the stream of air. The ping pong ball will be suspended by the air. Slowly tilt the hair dryer until the ball falls.

Repeat the demonstration but add a second ping pong ball. Depending upon power of the hair dryer, both ping pong balls will be suspended. Occasionally, the balls will swap their order as they bounce around in the air stream.

**Discussion:**

Rain and hail will be suspended by the updraft inside a thunderstorm until the weight of the hail and water can no longer be supported. Usually, the stronger the updraft in a thunderstorm, the more intense the storm and the larger the size of hail that can be produced.

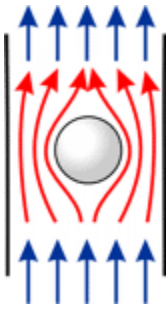
The ping pong ball remains in the stream of air due to lower pressure created around the surface of the ball. The effect is called the *Bernoulli Principle* named after Daniel Bernoulli, an eighteenth-century Swiss scientist, who discovered that as the velocity of a

fluid increases, its pressure decreases.



Bernoulli's principle can be seen most easily through the use of a venturi tube (see figure left). A venturi tube is simply a tube which is narrower in the middle than it is at the ends. When the fluid passing through the tube reaches the narrow part, it speeds up. According to Bernoulli's principle, it then should exert less pressure.

This low pressure effect also can be seen around the ping pong ball albeit in a different way. Instead of a narrowing in the center as in the venturi tube, the narrowing takes place around the perimeter of the ping pong ball (see figure right). In effect, there is an area of low pressure immediately adjacent to the ball.



The pressure is higher in the air outside of the stream created by the hair drier. The result is the ping pong ball bouncing from side-to-side as it reaches the edge of the flowing air and is pushed back into the region of low pressure. You can now repeat the experiment and this time have the students notice the back-and-forth oscillation of the ball as it tries to fall out of the stream but is push inward. [Another way](#) of seeing this is inward push.

Updrafts are responsible for the thunderstorms we experience. Generally the stronger the updraft, the stronger the thunderstorm. While we cannot predict if you will experience a thunderstorm on any particular day, we can know the area where thunderstorms are possible. If atmospheric conditions are such that the thunderstorms may become severe, the National Weather Service will issue a **SEVERE THUNDERSTORM or TORNADO WATCH**.

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