The Cloud in a Bottle

February 14, 2009 – Science Discovery Center

Using these instructions, you can create your own cloud in a bottle...
and learn about the science of how they form and how the ideal gas law works!

Things you need:

- A clear plastic two liter bottle
- A Fizz-stopper - a type of pump that can be used to keep the carbonation in soda
- A 1/4-1/3 cup of water (warm is best)
- Glade air freshener

How do you do it?

1) Put the water in the bottom of your bottle (just enough to make some "puddles"

2) Using the air freshener, put just a little squirt into the bottle (no more than half a second!)

3) Put the fizz stopper on tightly and pump it around 100 times. You shouldn't pump it over 200 times.

4)Hold the pumped-up bottle in front of a dark background and then open the top of the bottle. And watch the air in the bottle turn white with a cloud!!

5)If you take the cap off, you can actually squeeze some cloud out of the bottle!! Try it!

Questions about how it works:

- **Why do you need water in the bottle?**

  Liquid water is always *evaporating*, or letting water molecules escape and become gaseous water you can't see. The water in the bottle helps us make sure there is enough water vapor to form a cloud!

- **What happens to the air inside the bottle when you pump it up?**

  The *ideal gas law* tells us that when you increase the pressure of a gas (pump it up), the temperature must go up too! When you release the pressure, the temperature goes back down!

- **Why do you need a match or air freshener?**

  When water vapor cools, it *condenses*, or transforms into a liquid. We see that liquid as a cloud droplet! But before it can do that, it needs something to condense onto. Things like smoke, certain dusts, salt, and air freshener act as *cloud condensation nuclei (CCN)*. Maybe you can experiment with other kinds of particles to see if they are CCNs as well!