

A CLOUD IN A BOTTLE

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Introduction

Most days, we can look up and observe clouds in the sky. A cloud can be formed when water vapor encounters particulate material in the air at the correct temperature. Small droplets of water form which collect together in the form of a cloud.

There are three main types of clouds, stratus, cumulus, and cirrus.

Stratus clouds tend to form smooth, even sheets in the air. When these form close to the ground, they are called fog.

Cumulus clouds are the masses of puffy white clouds. They form when air currents rise and may tower to great heights.

Cirrus clouds are high, thin, white, feathery clouds. They are usually above the freezing level in the atmosphere and contain ice crystals.

Materials Needed

2-Liter plastic (PET) soft drink bottle with cap
wood splint
matches
water

Safety

After inserting the burning wood splint into the soft drink bottle, shake the bottle to extinguish the flame to prevent the bottle from catching fire. Part of the bottle will get hot to the touch.

Experimental Procedure

Obtain a 2-Liter soft drink bottle with a cap.

Add some room temperature water to the bottle. Cap the bottle and shake well. Open the bottle and pour out the water. Replace the cap on the bottle.

Light a wood splint or a match. Allow it to burn for a few seconds. Open the bottle and drop in the burning splint, then cap the bottle tightly and shake. The burning splint should go out leaving some white smoke in the bottle.

Squeeze the bottle hard. The inside of the bottle should be clear.

Release the pressure on the bottle. What do you observe?

Explanation

The initial addition of water to the bottle will cause the air to become saturated with water vapor.

The burning wood splint produces particulate matter in the air, the smoke, which will provide nuclei for the water vapor to condense.

Squeezing the bottle compresses the air and water vapor inside the bottle. When the bottle is released, the expansion of gases produces a cooling effect and some water vapor will condense to form a cloud or fog.