

# STEM EXTRAS

Cloud Formations



# Cloud Formation

## NGSS

4-ESS2; MS-ESS2

## Objective

**The student will understand** how clouds are formed and the effects of cold/warm temperatures on clouds.

**The student will be able** to create a contained cloud in a bottle.

## Vocabulary

**High Pressure System:** A mass of air with a high amount of pressure.

**Low Pressure System:** A mass of air with a low amount of pressure.

**Water Vapor:** Water in the form of a gas.

**Warm Front:** The area where a mass of warm air is beginning to replace a mass of colder air.

**Cold Front:** The area where a mass of cold air is beginning to replace a mass of warmer air.

## Background

Clouds are made up of tiny droplets of water or ice crystals. These droplets of water or ice crystals form from water vapor, the gaseous form of water. Clouds form when water vapor is pushed upward from a high-pressure system where a lot of air molecules and water vapor are packed together tightly to a low-pressure system where there is more space for the water vapor and air molecules to move around.

Low- and high-pressure systems bring warm fronts and cold fronts. A front is the area between large masses of air that are warm or cold (i.e. warm front and cold front). As air warms it rises, and as it rises it cools, causing water vapor to cool down and form either ice or water. This is similar to what happens to the steam that forms when boiling a pot of water. When the steam touches a cold surface, it will form water droplets.

## Materials

### For each group (2-3 students):

- Empty large bottle
- Air pump
- Rubber stopper with hole
- Rubbing alcohol

## Procedure

1. Put a small amount of rubbing alcohol in the bottle and coat the entire inside of the bottle by moving it around.
2. Put the rubber stopper in the top of the bottle, and secure it tightly.
3. Put the tip of the air pump in the hole of the rubber stopper, again make sure it is tightly secured.
4. Start pumping air into the bottle and continue for 30-45 seconds. This may become difficult and the students may need help.
5. Pull the rubber stopper with the air pump out of the top of the bottle. A cloud should form in the bottle. If not, repeat steps 3 through 5.

## Guiding Questions

- What different types of clouds do you know of?
- What kind of clouds have you seen?
- Is there currently a cold front or warm front in your area?
- Why does fog form?

## Career/Future Application

Meteorologist, Environmentalist

## Sources

Clouds And How They Form,  
Center for Science Education



Cloud in a Bottle Video  
by Sick Science

