

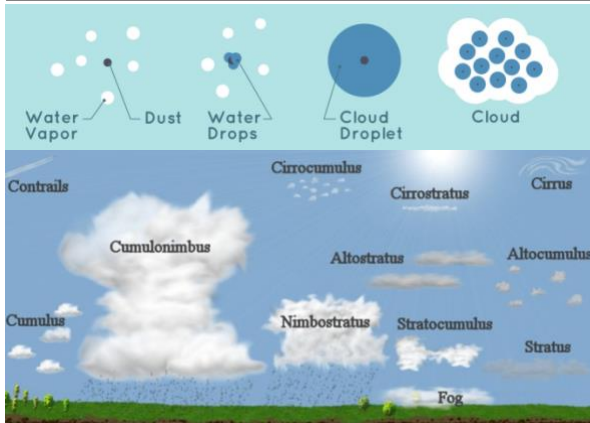
# DIY Air Force Activities: Condensing into Clouds



## Materials:

- glass mason jar with metal lid
- aerosol spray (hairspray)
- microwave
- microwaveable coffee mug
- ice cubes
- funnel
- water

**\*\*\*Warning!!! Hot water required!**  
**Ask an adult for assistance!**



[https://commons.wikimedia.org/wiki/File:Cloud\\_types.jp](https://commons.wikimedia.org/wiki/File:Cloud_types.jp)  
<https://climatekids.nasa.gov/cloud-formation/g>

Deciding what cloud formations in the sky remind you of is a fun activity! Does that cloud look like a dog, a plane, or a person? Perhaps it just looks like a mound of whipped cream in the sky! Have you ever wondered how those clouds got there in the first place? Clouds play an important role in the water cycle (see our Water Works DIY for more details). Heat from the sun warms water on the surface, which evaporates (liquid to gas) and rises into the air as water vapor. The water vapor begins to cool as it rises into the atmosphere, and some condenses (gas to liquid) on particles like dust, pollen, or ash floating in the air. These collections, along with additional water vapor, are attracted to one another and cluster together. This leads to cloud formation! The air can only hold so much water vapor! The amount it can hold is dictated by the temperature and weight (called the atmospheric pressure) of the air in the atmosphere. Once the clouds become full, or saturated, the water falls to earth as rain, ice, or snow (see diagram on the back). Different types of clouds are named by their height in the sky and their shape. Clouds don't just exist high in the sky! Did you know that fog is really a cloud that is just close to the ground? Following the directions below you can create your own cloud in a jar!

## Directions:

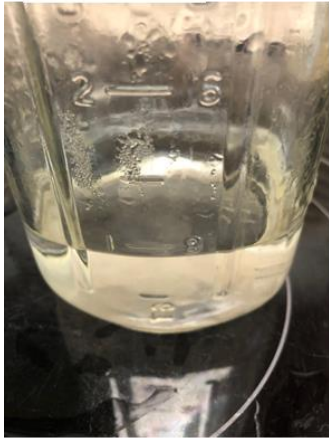
1. Fill your mug halfway with water and have an adult microwave it for 3 minutes. **CAREFULLY** pour the **very hot** water into the bottom of your mason jar using the funnel. **BE CAREFUL NOT TO BURN YOURSELF!**
2. Take your lid as shown in the image on the back and be prepared to put it on quickly.
3. Spray a small amount of your aerosol into the jar.
4. **QUICKLY** put the lid on upside down.
5. Immediately place the ice cubes on top of the lid.

What do you observe? Why do you think you had to add the spray? Would the experiment work without it? Why or why not? Record your observations and hypothesis and then test it!

## Air Force Associations:

Being able to predict the weather accurately is essential to the Air Force when planning and executing their missions. In 2018, the Air Force teamed up with the Oak Ridge National Laboratory to collaborate on a new high performance weather modeling system! This system runs forecast models as well as research and development that will help advance the Air Force's scientific weather prediction capabilities. <https://www.oml.gov/news/us-air-force-and-ornl-partner-high-performance-computing-and-weather-modeling-system>

Step 1:



Step 2:



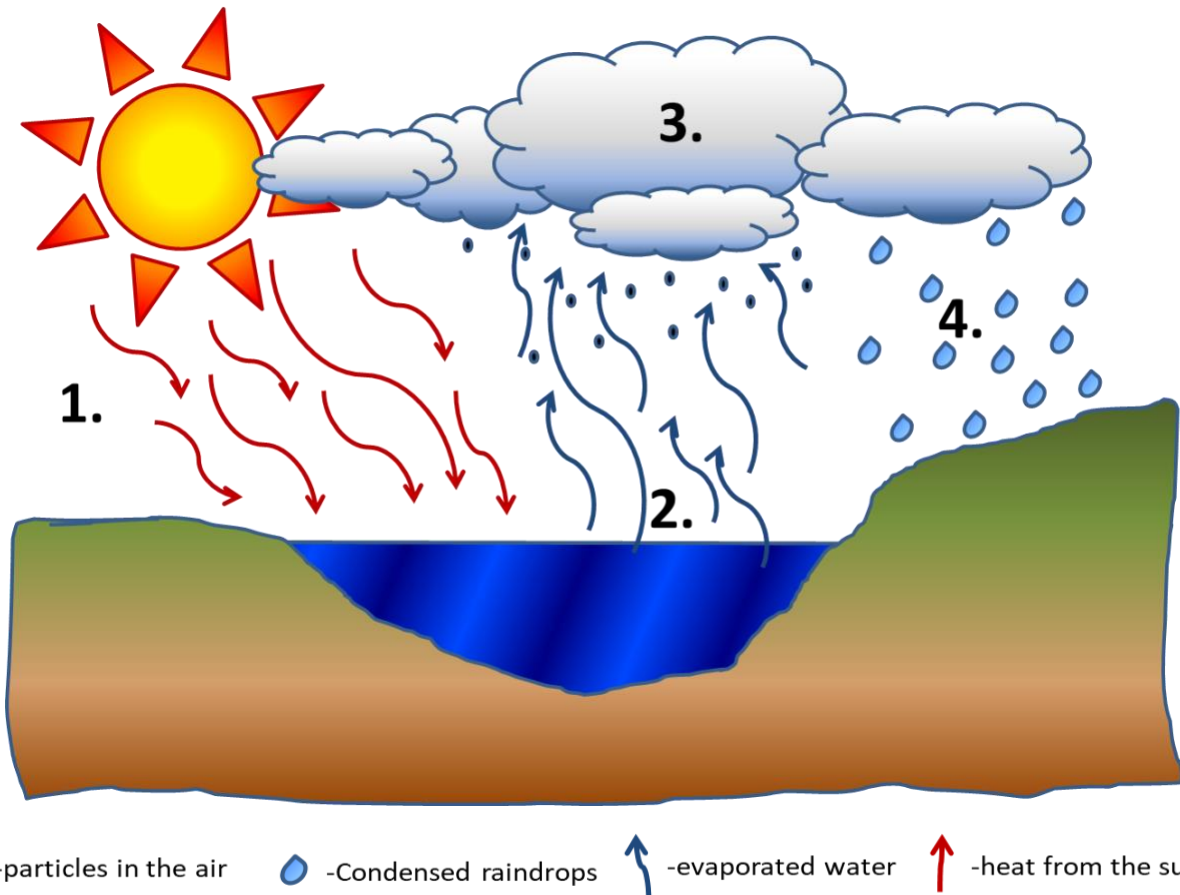
Step 3:



Step 4:



Step 5:



How clouds are formed:

1. The heat from the sun's rays warms the water on the ground.
2. The water gathers enough heat energy to undergo a phase change from liquid to gas. We call this evaporation. Once the water evaporates into water vapor it rises into the atmosphere.
3. The water vapor begins to cool and gather around small particulates in the air (dust, ash, or salt crystals) and forms a cloud droplet. The cloud droplets cluster together to form clouds.
4. The air can only hold so much water vapor. Once this limit has been reached, the cloud is considered to be saturated. The cooled water droplets either condense from gas to a liquid (rain) or freeze to a solid (deposition) and fall back to the earth as rain, snow, or ice.