



Cloud in a Jar

Target Grade: Grades K-8

Time Required: 15 minutes

Standards/Topics Covered:

- NGSS Standards
- 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

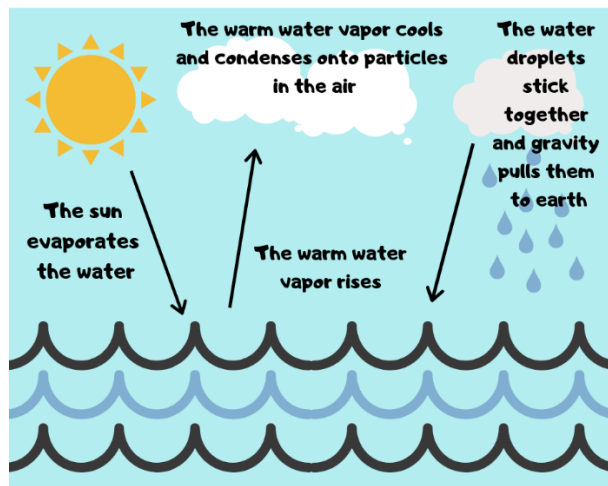
Central Focus:

In this activity, students will create a cloud inside of a glass jar. The benefit to this activity is that students are able to see the cloud forming and moving in the jar due to the hairspray. This activity could be used as an introduction to how clouds are formed and different weather systems.

Keywords: model, system, atmosphere, demonstration, interactions, interact, formation

Background Information:

What is a cloud made of? A cloud is simply a visible condensation of water that is suspended in the air. Clouds form as warm air rises in the atmosphere and then cools down. The sun heats water, which causes it to evaporate into the air. Warmer air rises and cooler air sinks. As the warmer air containing water vapor rises, it is cooled. As the water vapor cools, it condenses into water droplets onto particles, such as dust, in the air. As more and more air cools, more droplets are formed and create a visible cloud. When a large number of water droplets stick together, gravity pulls them back to earth, creating rain.





Materials

- Glass Jar with Lid
- 1/3 Cup of Hot Water
- Hairspray
- 1/3-1/2 Cup of Ice

Instructions

1. Pour the hot water into the jar.
2. Swirl the jar around.
3. Place the lid upside down on top of the jar.
4. Place the ice cubes onto the top of the lid.
5. Wait 20-30 seconds.
6. Remove the lid and quickly spray hairspray in the jar.
7. Put the lid back on the top of the jar, keeping the ice on the top just like before.
8. Watch as a cloud forms inside the jar!

Closure

1. What temperature change occurred when the ice was placed on top of the hot water onto the lid of the jar?
Some of the water turned to water vapor (gas) when poured inside the jar. When the water vapor rises, it meets the cooler air near the lid with the ice and condenses onto the hairspray, forming a cloud.
2. What phase change occurred right after the hair spray was quickly sprayed into the jar and the top was placed back on? How do you know?
Condensation occurred when the hairspray was quickly sprayed into the jar. We know this because the water droplets condensed onto the hairspray, causing a visible cloud to form in the jar. The cloud that we see is evidence of a condensation phase change.
3. What is the cause of the swirling of the cloud?
The swirling of the cloud that is visible in the jar is caused by the air circulating. Warm air rises and cooler air sinks. When the warm air rises to the top of the jar, it is cooled by the ice on the lid. When the cool air sinks to the hot water at the bottom of the jar, it is warmed. This creates a cycle of warm air rising and cool air sinking, making a visible swirling cloud.
4. Would the cloud still form if the hairspray was not present? Why or why not?
Yes, the cloud would still form, although it may not be as visible. The water droplets condense onto any available particle- dust, dirt, or in this case, hairspray. The hairspray in this activity helps the cloud to be more visible, but it would work without it!

