

Cloud in a Jar

LESSON SUMMARY

In this lesson, students will create a cloud in a jar. The benefit of this activity is the cloud in the jar forms the same way clouds form in the sky.

LESSON OBJECTIVE(S)

- Students replicate the same mechanisms that create clouds in the sky in a laboratory setting
- Students experience how models help scientists understand phenomena that happen on a large scale by replicating it on a small scale.

FOCUS QUESTION

How do clouds form?

LEARNING TARGET (I CAN STATEMENT)

I can model how clouds form.

STANDARDS ADDRESSED

AR: ESS2.C

MS: E.4.9A.1

TN: 3.ETS2 3.ESS2.1

MATERIALS

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

PROCEDURES

1. Pour the hot water into the jar. An electric kettle makes this part easier especially when doing multiple stations.
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/spray deodorant 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!
9. After observing the cloud in the jar, take the lid off. Tell students to touch the cloud.

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Closure

Lead a discussion on evaporation was occurring at the hot water in the bottom of the jar. As the water vapor rose, it entered a colder area of the jar and condensed into water droplet. This is how clouds form. What was done in the jar is what happens in the sky. It is hard to see that phenomenon happening since the sky is large and far away. Making a small-scale model helps us understand the science of clouds forming.

Possible questions to ask the class or things you can explain:

What was the ice on the jar modeling?

In the troposphere (level of atmosphere closest to the surface of Earth) as you increase altitude (go up) the temperature decreases. The ice makes the air in the top of the jar cooler than the air near the bottom.

Why did we use hairspray/spray deodorant?

Even though it is hard to see, our air is not just gases, there are also solids like pollen, dander, and dust. Water droplets need something to stick to, and these solids are what they stick to in the sky. In our model we use hairspray/spray deodorant to model that.

I saw swirling in my cloud. Why is that?

Air and water move around because of its temperature. Warm air and water want to rise because those molecules have more energy and are further apart from each other (less dense). Cool air and water want to fall because they have less energy, and those molecules are closer to each other (more dense). The swirling we saw was that movement happening. We call that convection.