

ACTIVITY 4

Cloud in a Bottle



MATERIALS

**Clear Plastic Bottle
with Lid**

Warm Water

Matches

Important Safety Information

- Always complete science activities with adult supervision, especially while using the scissors and/or hole punch.
- Read all directions BEFORE beginning any science activity. Use all materials as directed.
- Keep all materials away from your mouth, eyes, nose, ears, and other body openings. DO NOT eat or taste any materials.
- DO NOT PLAY WITH MATCHES OR FIRE. LEAVE THIS FOR ADULTS!

DIRECTIONS

1. Remind children about the first activity when they sprayed water on their hands. Ask: where did the water go? This will help students remember warm water evaporates into the air. This happens everywhere including inside the bottle. This is the first ingredient to make a cloud.
2. Work together to add warm water into the clear plastic bottle until it is about $\frac{1}{4}$ of the way full. Place the cap on.
3. The second ingredient in making a cloud is a change in air pressure. Air pressure is just like what sucked the bubble in the bottle or pushed it out. Clouds form when there changes in temperature and pressure.
4. We can change the pressure in the bottle by squeezing it.
Ask: When I squeeze the bottle, what do you think happens to the particles of water and air in the bottle? What happens to the pressure in the bottle when it is squeezed?



When I am no longer squeezing the bottle, what do you think happens to the particles of water and air in the bottle? What happens to the pressure in the bottle when it is not squeezed anymore?

Answer: *Squeezing the bottle reduces the space available in the bottle pressing everything together. This means squeezing the bottle creates high pressure. When the bottle is not being squeezed anymore, the particles have more space and less pressure. This changes the bottle from high to low pressure.*

5. Encourage children to squeeze and release the bottle and observe what happens.

Ask: What did you notice? (Note: nothing will happen.)

Answer: *The squeeze represents high pressure from the cool air that occurs in the atmosphere. The release represents low pressure from the warmth that occurs in the atmosphere. But! Nothing happens because we are missing an ingredient in cloud making...*

6. The water in the air needs something to hold on to in order for the particles to collect into a cloud. This is why dust and dirt are so important to making a cloud. In other words, clouds and everything that comes out of them (rain, snow, etc.) are dirty. Our bottles have water as well as changes in pressure and temperature, but there is not any dust. We need to add dust!

7. Let the children take the cap off the bottle. **ADULTS ONLY!** Carefully light a match and hold the match near the opening of the bottle. Then drop the match in the bottle and quickly put on the cap, trapping the smoke inside. Dust, smoke or other particles in the air is the third ingredient to make a cloud.

8. Like before, change the pressure in the bottle by squeezing the bottle firmly and letting go quickly.

9. **Ask:** What did you observe?

Answer: *A cloud appears when you release and disappears when you squeeze. Clouds form when there are changes in temperature, leading to evaporation. Finally, when there are changes air pressure (high pressure is when you are squeezing and low pressure is when you release) the water particles cluster around the dust particles making them visible as a cloud.*

10. Try changing the air pressure again by squeezing the bottle. What happens when the high pressure returns to the bottle?