



EXPLORING EARTH

Investigating Clouds

Try this!



Close the valve and squeeze the bulb 50 times to increase the pressure inside the bottle. Watch the thermometer on the side of the bottle. Does the temperature change as you pump?



Turn the bottle on its side and set it on the table. Flip the valve open to release the pressure in the bottle. What happens? Can you see a cloud form?



Shine the laser down into the bottle and quickly move it back and forth. How does the light from the laser change as it moves through the cloud?

Safety: Point the laser down, toward the table. Never point a laser at people, particularly toward their eyes.

Now try this!

Complete the *Investigate Your Sky Today* activity sheet to record cloud observations, and learn how you can share data with researchers who collaborate with NASA!

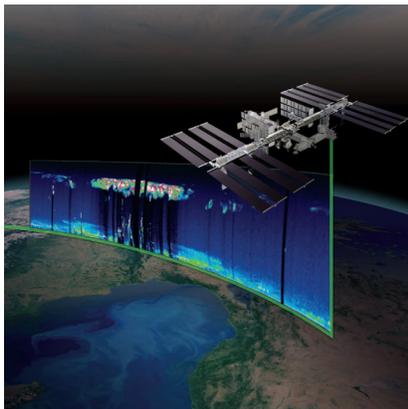
Clouds influence Earth's weather and climate.

Clouds form when individual water molecules combine into droplets. Each water droplet usually forms around a tiny particle of dust or soot in the air. Huge groups of these droplets together are visible in the atmosphere as clouds.

This activity uses alcohol vapor (gas) rather than water vapor to make a cloud, but it forms in the same way. By increasing the pressure inside the bottle, you also increase the temperature. When you release the pressure, the temperature drops, causing the vapor to *condense* into very small droplets you can see.

Clouds can keep our planet cooler by blocking and reflecting energy from the Sun, but they can also act like a blanket, absorbing and sending heat back to Earth. Studying cloud composition and behavior helps us predict day-to-day *weather*. Cloud research can also help us learn more about the Earth's *climate*, which is long-term trends and patterns in the atmosphere.

NASA researchers study clouds to better understand and predict how Earth's climate is changing. For example, the Cloud-Aerosol Transport System (CATS) on



NASA instruments help researchers make predictions about climate change.

the International Space Station uses lasers to measure clouds and other floating particles from space. By using a laser to observe the density of the cloud in the bottle, you model how the light detection and ranging (LiDAR) system on the CATS works.

NASA also collects information about clouds from Earth. People across the US can participate in citizen science programs to make observations about clouds and share data with researchers who collaborate with NASA!



Satellites like the International Space Station view clouds from above.