



Carl Sagan Venus Volcanos



Some of our world's finest minds, inventors, and artists are people with traits we often associate with autism. Albert Einstein, Emily Dickinson, and Mozart are all thought to have been on the autism spectrum. Another among those fine minds is Carl Edward Sagan. Sagan was an American astronomer, planetary scientist, cosmologist, astrophysicist, astrobiologist, author, science popularizer, and science communicator. His research helped to solve the mysteries of the high temperature of Venus (a massive greenhouse effect), along with making science fun and approachable for all. Today, inspired by Sagan's work, we'll explore the surface of Venus, a planet covered with volcanos and burning hot with an average temperature of 847 °F! Create your own volcano in this simple experiment, and don't worry, this "lava" won't burn you!

1



Gather materials:

- 2 Empty Plastic Water Bottles / Cups
- Playdough
- Baking Soda
- Vinegar
- Red/Orange Food Coloring
- Tray / Large Plate
- Spoon

2



Place one empty plastic water bottle or cup in the center of a tray.

NOTE:
The tray is to catch any mess from your volcano's eruption.



3



Surround your bottle/cup with playdough to create a volcano! Be sure not to cover the top of your cup. You should be able to later place items into the cup through the mouth of your volcano.

4



Once your volcano is finished, grab your second bottle/cup and add 1 cup of vinegar.

5



Add a few drops of food coloring to your vinegar to make it the color of your volcano's lava.

6



Spoon in 2 tablespoons of baking soda into your volcano's water bottle/cup.



7



Now for the eruption! Quickly add your colored vinegar into your volcano, and watch your lava erupt!

WHAT'S HAPPENING?

This was a simple **CHEMICAL REACTION**. A chemical reaction is when you combine two or more items together and create something new! When we combined baking soda and vinegar, the chemical reaction created carbon dioxide, which is a gas. That's what causes all the bubbles! The bubbles make our mixture **ERUPT** from our volcano.

Was that eruption too quick for you? Repeat the process by adding more baking soda to your water bottle and pouring in vinegar to create more lava! Also, your lava is safe to touch. Touch the tiny bubbles while they pop! What do they feel like?

Although our lava is safe to touch, lava on Earth and on Venus is very, very hot, up to 2000° F. Venus has the most volcanos in our solar system and 90% of its surface was covered by lava flow. Do you think the heat from these volcanos added to the overall high temperatures of Venus that Sagan was able to discover?