



VOLCANO STRATIGRAPHY: BE A PLAYDOUGH VOLCANOLOGIST

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Your Mission Today

Explore how a volcano is constructed through time by numerous lava flows.

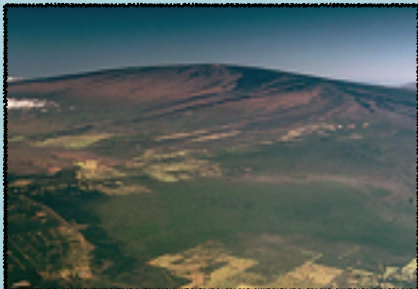
SCIENTIFIC BACKGROUND:

Volcanologists are geologists who study both active and extinct volcanos. One of the best ways to learn about how, why and when modern volcanos will erupt is to study old, sometimes very very old, volcanos. Examining the stratigraphy, or layers, of rocks in old volcanos helps the Volcanologists to unravel the history and type of eruptions that built any given volcano. In this activity you will construct your own shield volcano and map out the individual lava flows. Put on your geologist hat and discover how those lava flows interact and can tell the story of a volcano's history.



Materials:

- | | |
|----------------------------------|--------------------------|
| Playdough (recipes below) | Scissors |
| Paper Towels | Scotch tape |
| Baking Sheet (with raised edges) | Baking Soda |
| Aluminum Foil | Vinegar |
| 5 Dixie Cups (3 oz cups) | Measuring Spoons |
| Ruler | Food Coloring (4 colors) |
| Pencil | |



MAUNA LOA, A SHIELD VOLCANO IN HAWAII, UNITED STATES.

Photograph by J.D. Griggs on January 10, 1985



BAKING SODA AND VINEGAR SIMULATE ERUPTIONS.

Low viscosity (thin) lava. Shield Volcanism.



LAVA FLOWS CONSTRUCT VOLCANOS.

Successive lava flows build the rock stratigraphy of a volcano. Look into the past!



Volcano Building!



- Instructions -

1. Assemble all materials on a table or other surface that can come into contact with food coloring. Make sure towels are standing by.
2. Cover baking sheet with aluminum foil if desired. The surface of the foil need not be perfectly straight. Bumps and wrinkles provide “native topography” and make the surface much more like that of the Earth.
3. Cut one dixie cup to a height of 2.5 cm. Secure the cup with tape to the center of the baking sheet. This cup is your volcanic vent and will be the source of your eruptions.
4. Fill each of the 4 dixie cups with 6 teaspoons or 1/8 cup vinegar.
5. Add 1-3 drops of food coloring to each paper cup; make each cup a different color. It is helpful to match the colors to your 4 colors of playdough.
6. Place 1 tablespoon of baking soda into the dixie cup on the baking sheet.
7. It is now time to set off a volcanic eruption! Pour one of the cups of the vinegar into the small cup with the baking soda. Watch carefully as the lava flows.
8. Carefully cover the areas where the lava flowed with the matching color of playdough. Note: as you cover the lava with playdough, it may cause the vinegar to move around. Try to cover just the original lava flow.

Repeat steps 7 and 8 for each color of vinegar and playdough. You may clean out some of the spent baking soda and vinegar from the eruption cup and add new baking soda as needed. Also, it is helpful to gently blot up the excess lava flow vinegar from the baking sheet between each eruption. Paper towels work very well.



Did you know:

Mauna Kea is the tallest volcano on Earth. It rises 13,798 feet above sea level. It extends an additional 19,700 feet to the bottom of the sea.

Mauna Kea was built one lava flow at a time. Just like your volcano!

Let's Do Some Scientific Pondering!

QUESTIONS TO CONSIDER

1. Is there any land (original baking sheet surface) still visible? Where?
2. Can you still see the first lava flow? The second? The third? Where? Which one is the oldest?
3. If you hadn't seen this volcano erupt, how could you figure out which lava flow erupted first?
4. Did the lava always flow along the same path?
5. What causes the different lava flows to go in different directions? What influences the lava's path?

ADDITIONAL ACTIVITIES

1. Sketch your volcano and its various lava flows. Maybe try using colored pencils that match the colors of your playdough! This is how geologists map existing volcanos.
2. Cut into your volcano in several places. Can you see different lava flows along the edges of the slices? Geologists sometimes have views like this in older volcanoes, such as where running water has cut canyons through the rocks. It is a great way to see into the past!
3. What would happen if the lava flow was more viscous, or more thick? Try it! Warning: this will make a mess of your volcano! What liquids can you find in your kitchen that are more viscous than vinegar? What happens if you pour them down one small edge of your volcano? (Note: do this without baking soda. Other liquids are unlikely to erupt. This is just a demonstration of different types of lava flows.) Do thicker liquids flow differently than vinegar? What might cause different lava flows to be thicker or thinner?

* **Discover More!** Check out The Smithsonian's Dynamic Earth

<http://www.mnh.si.edu/earth/>

Make PlayDough At Home!

Notes:

1. To keep playdough fresh, store in airtight container in refrigerator for several months.
2. Although playdough is non-toxic, please keep away from pets. Ingesting even a small amount of playdough can make pets very sick.

PLAYDOUGH RECIPE (STOVE TOP)

1 cup flour
1/2 cup salt
2 teaspoons cream of tartar
8 teaspoons or 1/6 cup oil
1 cup cold water
food coloring

1. Combine all ingredients in a large saucepan. Add food coloring.
2. Over medium heat, stir constantly until mixture forms a large ball. This may take 7-10 minutes.
3. Turn dough out onto floured surface. Let cool until easy to handle.
4. Knead until dough is smooth and elastic. Add extra flour as needed to prevent dough from being sticky.

For Volcano Stratigraphy Activity, repeat this recipe to make 4 different colors.

PLAYDOUGH RECIPE (NO-COOK)

1 cup flour
1/2 cup salt
3 teaspoons alum or cream of tartar
1 tablespoon oil
1/2 cup cold water
food coloring

1. Combine all ingredients.
2. Knead until smooth and elastic.

For Volcano Stratigraphy Activity, repeat this recipe to make 4 different colors.