



Volcanic Eruption Protocol - Student Page

Dark Skies: Volcanic Contribution to Climate Change

Investigate

Particles Matter

Materials

- 3 snack-sized ziplock bags
- Permanent marker
- Small beaker of vinegar
- About 3 tsp of baking soda
- About 3 tsp of flour
- 3 pieces of white paper
- Flashlight
- Light meter (optional)
- Ruler
- Safety glasses

Part 1: A Volcanic Eruption

In this investigation, you will explore the effects of a volcanic eruption on the atmosphere by making a simple model.

1. Collect the materials listed above.
2. Each person should wear safety glasses or goggles during the investigation.
3. Use a marker to number each ziplock bag (1-3). Write the number towards the top of the bag (Note: you don't want the writing to make it hard to observe the inside of the bag during the experiment).
 - 1 - This will be the control, or normal atmosphere.
 - 2 - This will model a volcano that spews gas.
 - 3 - This will model an explosive volcano that spews gas, ash, and rock particles.
4. In bags 2 and 3, add about 1 teaspoon of baking soda.
5. In bag 3, add about 2 teaspoons of flour.
6. In bag 1, seal all but a small opening. Blow air into the bag and seal. Set the bag up on its end as shown in the picture to the right (or you can tape it to a wall). Record observations in your data table (on page 2).
7. In bag 2, seal all but a small opening. Add 2 Tablespoons of vinegar and QUICKLY seal. Very GENTLY swirl the contents and set the bag up on its end (or tape to a wall). Record observations in your data table.
8. In bag 3, seal all but a small opening. Add 2 Tablespoons of vinegar and QUICKLY seal. Very GENTLY swirl the contents and set the bag up on its end (or tape to a wall). Record observations in your data table.
9. Record what you think the model represents for each bag in column 3 of the data table; be descriptive.





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Data Table: Observations of a model showing effects of volcanic eruptions

Bag number	Observations (write or sketch)	Description (<i>What does this represent?</i>)	Amount of Light

Part 2: The Sunlight

Next you will model sunlight reaching Earth following a volcanic eruption. The flashlight represents the Sun, the white paper represents the surface of the Earth, and the three ziplock bags represent the atmosphere in different conditions. If a light meter is available, use this to measure the amount of light shining through each bag.

- Label 3 pieces of white paper:
 - 1 - Control, normal atmosphere.
 - 2 - Volcano spewing gas.
 - 3 - Volcanic explosion.
- Tape the first paper (1) onto a wall. Without disturbing the contents, hold the control bag (1) about 30 cm away from the paper, using the ruler to measure the distance. Have one person use the flashlight to shine light through the bag. Angle the flashlight so that the light hits the white paper. Have another person use a pencil to shade on the paper what the surface looks like. Have another person write down observations in the last column of the data table.
- Repeat step 2 with the other two pieces of paper and the other two ziplock bags, (2) and (3).

Answer the following questions.

- In which of the three examples did the sunlight shine through and reach the Earth's surface (the white paper) the most? In which did it reach the least? Explain why.
- How does this model represent what happens to the atmosphere during a volcanic eruption? Use specific examples from the model in your answer.