Name:

Volcanic Eruption Protocol - Student Page

Dark Skies: Volcanic Contribution to Climate Change

Investigate
Particles Matter

Part 1: A Volcanic Eruption
In this investigation, you will explore the effects of a volcanic eruption on the atmosphere by using a simple model. Get in your assigned group of 3. As your teacher directs, collect the materials you will need for this investigation.

1. Record your observations in the data table below.

Observations of a model showing effects of volcanic eruptions

Baggie	Describe *What does this represent?*	Sketch	Amount of Light

2. Put on your safety glasses or goggles.
3. At the very top of the baggie (by the seal), label each baggie. (Hint: Be sure not to mark on the main part of the baggie as this will obstruct the view of what's going on inside.)
    - 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 baggies 2 and 3, add about 1 teaspoon of baking soda.
5. In baggie 3, add about 2 teaspoons of flour.
6. In baggie 1, seal all but a small opening. Blow air into the baggie and seal. Set the baggie up on its end
7. (alternatively, you can tape it to a wall). Record observations in your data table.
8. In baggie 2, seal all but a small opening. Add 2 Tablespoons of vinegar and QUICKLY seal. Very GENTLY swirl the contents and set the baggie up on its end (or tape). Record observations in your data table.
9. In baggie 3, seal all but a small opening. Add 2 Tablespoons of vinegar and QUICKLY seal. Very GENTLY swirl the contents and set the baggie up on its end (or tape). Record observations in your data table. Be sure to note what you think the model represents for each baggie; be descriptive.

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Part 2: The Sunlight

You will now 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 baggies represents a control, a "normal" atmosphere, and after a volcanic eruption. (Hint: If a light meter is available, use this to detect the amount of light shining through the baggie.)

1. Label 3 pieces of white copy paper, 1 (Control, normal atmosphere), 2 (Volcano spewing gas), and 3 (Volcanic explosion). Tape the first paper (1) onto a wall. Without disturbing the contents, hold the first baggie (1) about 30 cm away from the paper, using the ruler as a guide to the distance. Have one team member use the flashlight to project a beam of light through the baggie so the light hits surface (the white paper). Have another team member use a pencil to shade in, on the white paper, what the surface looks like. The third team member will write down observations.
2. Repeat step 1. with baggies (2) and (3).

Answer the following questions.

1. In which of the three examples did the "sunlight" shine through and reach the "earth's surface" the most? In which did it reach the least? Explain why.

2. How does this model represent what happens to the atmosphere during a volcanic eruption? Use specific examples from the model in your answer.

3. Imagine that you conducted this investigation on a much larger scale. Use what you've learned so far, and what you know about weather patterns, to predict what the atmospheric effects would be very close to the volcanic eruption, hundreds of miles away, and thousands of miles away.

4. How do the ash and volcanic particles that are forced into the atmosphere affect the temperature at the Earth's surface, both immediately after the eruption and over time? (Hint: Think about the Sun and its importance to us on Earth.)

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