

## Lab: Measuring Gas Emissions from a Model Volcano

Adapted from Earth Science, copyright 2006 by Hold, Rinehart and Winston

Volcanoes are a result of energy being redistributed from the Earth's core. They are typically found on a convergent plate boundary, where an oceanic plate subducts beneath a continental plate.

Volcanic eruptions are preceded by gaseous emissions. These emissions are indicators of how explosive an eruption will be. The more gas released the more explosive the eruption is going to be. Geologists are constantly monitoring the amount of gas coming out of volcanoes, in an attempt to predict eruptions and to determine whether or not evacuation would be necessary.

During this lab, you are going to model the gas emissions generated from a volcano. You will collect and measure the amount of gas released. Your job will be to come up with the correct combination of reactants that produce the 'threshold' amount of gas. A threshold is the maximum amount of a substance that can be tolerated by a human without causing danger or damage. For a real volcano, the threshold amount of gas would indicate a pending eruption. Typical gases are water vapor, carbon dioxide and sulfur dioxide. In this lab you will be analyzing carbon dioxide.

You will be modeling the gas emission by combining acetic acid and sodium bicarbonate. The chemical equation for this reaction is:



1. Count the number of atoms of each element present on each side of the equation.

\_\_\_ H \_\_\_

\_\_\_ Na \_\_\_

\_\_\_ C \_\_\_

\_\_\_ O \_\_\_

2. Is the equation balanced? Explain why all chemical equations must be balanced.

3. List the reactants in this equation:

4. List the products in this equation:

5. Which of the products will be the gas that is collected during this lab?



### Analysis and Conclusion

1. What are the values of each reactant that generate the threshold value (or closest to it) for the gas?

2. In your own words, define 'threshold value'.

3. Where else would a threshold value be utilized?

4. Restate the purpose of this lab and how it ties into the study of volcanoes.

5. How does the study of volcanic eruptions differ from the study of earthquakes?

6. For which trial(s) would you order an evacuation? Explain why.