VOLCANIC ERUPTION LAB- Teacher's Guide

INTRODUCTION

Background for the teacher: Explosive eruptions result when blockage of a volcano's crater prevents the release of gases. Volcanoes that erupt explosively have highly viscous (sticky) lava that is high in silicon dioxide. This high viscosity prevents the gases trapped in the lava from being released, leading to a build up of pressure over many years. Eventually, pressure builds to the point where an explosive eruption occurs from the weakest point in the volcano.

Problem/Objective: Can we construct a working model of an explosive volcanic eruption from common household items?

Research: Students should be placed in collaborative groups of approximately four people. At the teacher's discretion, roles can be assigned to each student, for example using the "Six Thinking Hats" method (http://www.debonogroup.com/six_thinking_hats.php)
Students will be allowed to research how volcanoes erupt explosively via computer lab, classroom or school library, or BYOD (Bring Your Own Device) through a list of approved resources. A sampling is included below:

- http://www.youtube.com/watch?v=joJbBahgoSY
- http://www.scientificamerican.com/article.cfm?id=what-causes-a-volcano-to
- http://volcanoes.usgs.gov/hazards/gas/index.php
- http://vulcan.wr.usgs.gov/Outreach/AboutVolcanoes/how_do_volcanoes_erupt.html
- http://chemistry.about.com/cs/howtos/ht/buildavolcano.htm
- http://www.beloit.edu/sepm/Earth_Works/Modeling_a_Volcano.html
- http://www.stevespanglerscience.com/experiment/volcano-eruptions
- Volcano!: The Icelandic Eruption of 2010 and Other Hot, Smoky, Fierce, and Fiery Mountains (National Geographic Kids): by Judith Fradin, Dennis Fradin
- Volcano: The Eruption and Healing of Mount St. Helens by Patricia Lauber

After researching how explosive eruptions occur and various methods for modeling them with common household items, students should Brainstorm a method for constructing their own model of an explosive eruption. During brainstorming, students should clearly define the topic, generate as many ideas as possible, NOT change, criticize, or evaluate each others ideas, encourage participation by other group members, and continue until all ideas have been presented (again, this is where the Six Thinking Hats method can provide roles and structure for the students).

After Brainstorming, students should evaluate their results by clarifying their ideas, putting them into categories, ranking the ideas, choosing a final idea they want to pursue, and getting teacher approval for their idea.

Materials:

Students should make a list of all materials they will require for constructing their model.

Hypothesis:
Students should formulate a testable hypothesis, such as “A model of an explosive eruption can be constructed with _____.

Prediction:
If… **then**… will happen, **Because**…

Example Prediction: IF we use baking soda and vinegar in a closed container to construct a model explosive eruption, THEN it will erupt like a real explosive volcano, BECAUSE vinegar and baking soda mixed in a closed container will produce gas pressure, which is what causes a real volcanic eruption.

Procedure:
Students will formulate a set of procedures to test their hypothesis. Procedures should be detailed enough that someone unfamiliar with their investigation would be able to follow their steps and achieve similar results. Students will then use the procedures they have designed to test their own hypotheses.

Data Collection:
Students should:

1. Describe or summarize their eruption.
2. Draw and label their model using scientific vocabulary
3. Analyze, critique, and revise their models
4. Retest their model (if time permits)

Conclusion:

Students should make a scientific claim: Their model did (or did not) erupt like a real explosive volcano. They will conclude the lab by writing out an argument to support that claim with valid reasoning, using evidence from source texts: books, internet sources, journals, etc. while evaluating the reliability of those sources.