



Drexel-SDP GK-12 ACTIVITY

Subject Area(s): Landscapes, Scientific Method, Variables

Associated Unit: None

Lesson Title: Build Your Own Volcano

Header



Image 1

Description: Cartoon picture of an erupting volcano

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Grade Level 6

Lesson # 1 of 1

Time required: 2 hours

Summary

Students will use the scientific method to determine how to get the biggest “explosion” from a volcano. Students will also gain background into how volcanoes work as well as background into a chemical reaction.

Engineering Connection

Engineers must use the scientific method if conducting experiments.

Keywords

Landscapes, scientific method, volcano, baking soda, vinegar, variables

Educational Standards

- Science: 3.1.7b, 3.2.7a, 3.2.7b, 3.2.7c
- Math: Graphing

Pre-Requisite Knowledge

Learning Objectives

After this lesson, students should be able to:

- Use the scientific method to determine the biggest ‘explosion’
- Understand how to run and measure the results from a chemical reaction

Introduction / Motivation

Start by telling the students that they are going to be making volcanoes that explode. To introduce the students to the ingredients they will be working with (baking soda and vinegar), make an exploding bottle. Start with a clear plastic water bottle (about 12 oz) and wrap up as much baking soda as will fit into the bottle into a paper towel (this delays the interaction with vinegar and delays the release of gas) and place into the bottle. Ask for a volunteer and have them pour vinegar (about 1 cup) into the bottle. Place a stopper on top of the bottle and stand back. The stopper will go shooting off of the bottle and make a loud popping noise that should definitely get everyone’s attention.

Now, switch over to the topic of volcanoes and briefly review what causes the volcano erupt. In terms of making a volcano with vinegar and baking soda, ask how the students would use the scientific method to create the biggest eruption. Review the scientific method and ultimately, come up with a hypothesis (i.e. more ingredients, bigger eruption). Set up an experiment to test the hypothesis and go over the variables. Note, 6th grade already had variable in 5th grade, so this should be a review. Go over dependent, independent, and control variables, which variables they should control, which one they should change, and which one they will measure.

Lesson Background & Concepts for Teachers

Baking soda + vinegar produces carbon dioxide. This is an example of an acid (vinegar) and base (baking soda) reaction. The product of carbon dioxide is what causes the stopper to pop off the bottle and what causes the solution to fizz up when baking soda and carbon dioxide are mixed together.

Image Insert Image # or Figure # here, [indicate: left justified, centered or right justified]

Vocabulary / Definitions

Word	Definition
Variables	Things that are likely to vary
Control variable	Variables that are kept constant
Dependent variable	Variable that we measure
Independent variable	Variable that we change

Associated Activities

Materials

- Tap water
- Baking soda
- Vinegar
- Plastic cups (9-12 oz)
- Aluminum foil
- Paper/plastic plate
- Liquid measuring devices (i.e. graduated cylinders)
- Tray/pan to conduct the “eruption” in
- Popsicle stick (stir water and baking soda)

Pre-Activity Preparation

- Determine the desired amount of water and baking soda to mix together based on the size of the cup used.

With the Students

1. Have the students record in their notebook a table where the first column is the amount of vinegar used (independent variable) and the second column is the eruption size (dependent variable).
2. Show the students how to make the volcano:
 - a. Place the cup face on the plate (this will be the opening to the volcano)
 - b. Wrap the entire cup and plate in aluminum foil. Be sure to leave the cup open because this is where the ingredients will be mixed.
3. Because the amount of baking soda and water is controlled, students can mix the proper amounts of baking soda and water into their volcanoes. Stir with the popsicle stick to mix.

4. One at a time, have the students come up to the front of the class, place the volcano in the tray, and have them add the vinegar to the volcano. After the eruption, remove the volcano and measure the amount of liquid remaining in the tray.
5. Record the results on the board.

Post-Activity Assessment

Have the student graph the results and determine if their hypothesis was correct.

Lesson Closure

Investigating Questions

- What could we change to improve upon the experiment?
- Was our hypothesis correct?

References

Owner

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