

Volcano Experiment and Earthquake Demo

Week 26 — Wednesday | Modeling Fast Changes to Earth

Reading Time

Today you will create models of two fast changes to Earth: a volcano eruption and an earthquake. Scientists and teachers use **models** to help us understand events that are too big, too dangerous, or too rare to observe directly. A volcano model lets you see what happens when pressure builds up inside a volcano and is released suddenly. An earthquake shake table shows how buildings respond when the ground moves beneath them.

For your **volcano model**, you will use baking soda and vinegar to simulate an eruption. The baking soda represents magma building pressure inside the volcano, and the vinegar represents the trigger that causes the eruption. When the two mix, they create carbon dioxide gas, which pushes the liquid up and over the volcano just like real lava flows from a real volcano. You can add food coloring to make the lava look more realistic and dish soap to create extra foam.

For your **earthquake shake table**, you will build a simple platform and place small structures on it. When you shake the table, you will see how different types of buildings respond to seismic waves. Short, sturdy buildings tend to stay upright while tall, narrow buildings are more likely to topple over. Engineers use this kind of testing to design buildings that can survive earthquakes in earthquake prone regions like California, Japan, and Chile.

Reading Questions

1. Why do scientists use models to study natural events?

2. In the volcano model, what do the baking soda and vinegar represent?

3. What do you expect to happen when you shake the earthquake table with different building designs?

4. Explain how engineers use earthquake testing to make buildings safer. What types of buildings do you think survive earthquakes better and why?

Vocabulary Grid

Write a definition or draw a picture for each word.

 **Model**

 **Carbon Dioxide**

 **Seismic Waves**

 **Shake Table**

 **Eruption**

 **Hypothesis**

Volcano Model Experiment

Materials: Small bottle or cup, baking soda, vinegar, food coloring (red or orange), dish soap, a baking sheet or tray, clay or modeling compound to build the volcano shape, spoon.

Setup: Build a volcano shape around the bottle using clay. Leave the top of the bottle open. Place the baking sheet underneath to catch the eruption.

Before you start: Write your hypothesis. What do you think will happen when you mix the baking soda and vinegar?

Volcano Eruption Data

Trial	What You Added	How High Did It Erupt?	How Far Did Lava Flow?
First eruption	2 tbsp baking soda, 1/2 cup vinegar		
Second eruption	3 tbsp baking soda, 1/2 cup vinegar, 1 tsp soap		

Earthquake Shake Table

Materials: A flat board or stiff piece of cardboard, two stacks of books (same height), modeling clay, blocks or small paper cups.

Setup: Place the board on top of the two book stacks so it can slide back and forth. Build two different structures on the board using clay and blocks. One should be short and wide, the other tall and narrow.

Earthquake Test Results

Building Type	Sketch Before	What Happened?	Still Standing?
Short and wide			
Tall and narrow			

Experiment Analysis

1. What caused the volcano eruption? Describe what happened when you mixed the baking soda and vinegar.

2. How did adding dish soap change the eruption? Did it make it bigger or smaller?

3. Which building survived the earthquake better? Explain why.

4. Compare your model experiments to real fast changes on Earth. How are they similar and how are they different?

True or False — Circle Your Answer

- ☐ 1. Scientists use models to study events that are too dangerous to observe directly.
- ☐ 2. In the volcano model, baking soda and vinegar create carbon dioxide gas.
- ☐ 3. Tall, narrow buildings usually survive earthquakes better than short buildings.
- ☐ 4. A hypothesis is a prediction made before an experiment.
- ☐ 5. Adding dish soap to the volcano mixture makes the eruption smaller.
- ☐ 6. Engineers test building designs to make them safer during earthquakes.
- ☐ 7. A volcano model accurately shows the exact temperature of real lava.
- ☐ 8. Seismic waves travel through the ground during an earthquake.

Fill in the Blanks

Word Bank: model carbon dioxide eruption shake table hypothesis seismic waves engineer pressure

- 1. A simplified copy used to understand a real event is a _____.
- 2. The gas created by baking soda and vinegar is _____.
- 3. When a volcano releases lava and ash, it is called an _____.
- 4. A platform you shake to test buildings is a _____.
- 5. A prediction made before an experiment is a _____.
- 6. Energy that travels through the ground during an earthquake are _____.
- 7. A person who designs buildings is an _____.
- 8. The force that builds up inside a volcano before an eruption is _____.

Think About It

If you were an architect designing a building in an earthquake zone, what features would you include to make it safer? Think about shape, materials, and foundation.
