MONCHO UNSCHOOLING

Volcanoes

Unit Study

“Build erupting models, explore the chemistry of lava lamps and baking soda reactions, and map real volcanic hotspots to understand the explosive forces that shape our planet from deep within.”

Earth Science | Chemistry | Geography

By: Alba Nory de González

monchounschooling.com

EARTH SCIENCE

Volcanoes aren't just mountains that explode—they're windows into the molten engine churning miles beneath your feet. You'll model eruptions, map the ring of fire, and discover why some volcanoes ooze while others blast.

Volcanic eruption stages **Tectonic plate boundaries** **Lava vs magma behavior**

Build Three Volcano Shapes

Why do some volcanoes tower steep while others spread flat and wide?

Your kitchen counter becomes a volcano lab.

Grab three empty bottles. Pour honey down the outside of one, water down another, and dish soap down the third. Watch how each liquid builds a different mountain shape. Real lava does exactly this—thick magma piles into steep cones, thin lava spreads into shields.

Make it Easier: Use just two liquids and compare their shapes.

Level it Up: Add red food coloring and measure the angle of each slope with a protractor.

Map the Ring of Fire

Why do most volcanoes cluster around the Pacific Ocean's edges?

Print a world map or sketch the continents on paper.

Mark every active volcano you can find online with a red dot. Notice the pattern forming a ring around the Pacific. Now overlay tectonic plate boundaries—they match perfectly. Volcanoes erupt where Earth's crust cracks and shifts.

Make it Easier: Mark just ten volcanoes and find the pattern.

Level it Up: Research one volcano on your map and present its eruption history to someone.

Lava Lamp Science

How does molten rock move inside Earth's mantle?

Fill a clear bottle three-quarters with vegetable oil and add water until nearly full.

Drop in a fizzing antacid tablet and watch blobs rise and fall. This models convection currents—hot magma rises, cools, then sinks, driving tectonic plates above.

Make it Easier: Skip the tablet and just observe oil and water layers.

Level it Up: Add food coloring and time how long convection currents last.

CHEMISTRY

Eruptions aren't magic—they're chemistry in action. You'll mix acids and bases, trap gases, and watch reactions bubble, foam, and explode just like molten rock breaking through Earth's crust.

Acid-Base Reactions | **Gas Production and Pressure** | **Temperature and Reaction Speed**

Kitchen Eruption Lab

What makes vinegar and baking soda react so violently when they meet?

Your kitchen sink is a volcanic chamber.

Pour vinegar into a bottle, add a spoonful of baking soda, and watch carbon dioxide gas explode upward. Try adding dish soap—does the foam climb higher? Test warm vinegar versus cold. Which erupts faster?

Make it Easier: Use a small cup and watch the bubbles rise.

Level it Up: Measure gas production by capturing it in a balloon stretched over the bottle opening.

Pressure Chamber Test

How does trapped gas create enough force to crack solid rock?

A plastic bottle becomes your magma chamber.

Fill it halfway with warm water, drop in an antacid tablet, and quickly cap it. Shake gently and set it down. The pressure builds until the cap pops. Real magma does this—gas builds until rock can't hold it anymore.

Make it Easier: Use a larger bottle so the pop is gentler.

Level it Up: Compare cold versus hot water—does temperature change how fast pressure builds?

Speed Test

Why do some eruptions happen instantly while others simmer for years?

Three identical cups, three temperatures, one reaction.

Drop an antacid tablet into ice water, room-temperature water, and hot water at the same moment. Which fizzes fastest? Heat speeds up every chemical reaction on Earth—including the ones happening miles below your feet.

Make it Easier: Use just two temperatures.

Level it Up: Graph the time each reaction takes to finish.

GEOGRAPHY

You've seen eruptions in your kitchen—now zoom out to see where real ones live. You'll map volcanic hotspots, trace tectonic plate edges, and discover why some countries shake while others sleep.

Ring of Fire **Volcanic Islands** **Hotspot Mapping**

Ring of Fire Border Patrol

Why do volcanoes form a ring around the Pacific Ocean?

Your mission: outline the Ring of Fire on a blank world map.

Use a red marker to trace the edges of the Pacific plate—from Japan down to New Zealand, up past the Philippines, across Alaska, and down the Americas. Mark every volcano you can find online or in an atlas. Count how many sit right on that red line. This is where Earth's crust collides and melts.

Make it Easier: Mark just five volcanoes and connect them with a line.

Level it Up: Add earthquake zones in yellow and compare the overlap.

Island Birth Certificate

How does a volcano build an entire island from nothing?

Hawaii wasn't always there—it rose from the ocean floor, layer by layer.

Draw a cross-section showing seafloor, rising magma, and layers stacking into an island. Label the hotspot below that never moves while the plate slides over it. Research how old the Big Island is compared to Kauai. The ages tell you which way the plate is drifting.

Make it Easier: Sketch just the island and hotspot, no plate movement.

Level it Up: Map the entire Hawaiian chain and predict where the next island will appear.

Hotspot Detective Work

Why do some volcanoes appear in the middle of tectonic plates, far from any edges?

Hotspots punch through plates like a blowtorch through moving metal.

Find Yellowstone, Hawaii, and Iceland on a map. Mark each with a dot and research whether it sits on a plate boundary or in the middle. Hotspots stay still while plates drift above them, leaving trails of old volcanoes. Can you spot the trail?

Make it Easier: Focus on Hawaii's island chain only.

Level it Up: Calculate how fast the Pacific plate moves using island ages and distances.