



How's Your Lava Life?

Purpose

Students witness the flow of magma through a model volcano and observe the formation of dikes along which the magma flows.

Time Required

25–30 minutes

Lab Ratings



TEACHER PREP

CONCEPT LEVEL

CLEAN UP

MATERIALS

- water
- 500 mL beaker
- 4 envelopes of unflavored gelatin
- 2 L bowl
- stirring rod or spoon
- red food coloring
- small container with a lid
- 3 L bowl
- 4 clay bricks
- pegboard, 40 × 60 cm, with 5 mm holes
- large tray or cookie sheet
- syringe (found in pet stores)
- rubber tubing
- large knife



Advance Preparation

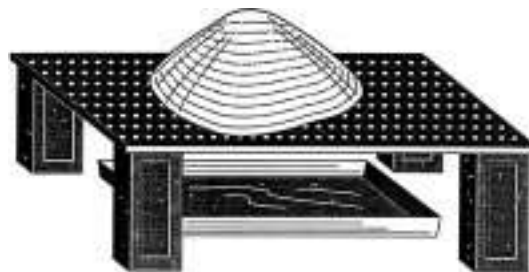
- Prepare the gelatin for the volcano model by mixing 500 mL of cool water with the contents of four envelopes of unflavored gelatin in the 2 L bowl. Stir for 30 seconds. Boil 1.5 L of water in a saucepan on a hotplate. Add 1.5 L of boiling water,

and stir until the gelatin is dissolved. Refrigerate for at least 3 hours or overnight.

- Prepare the “magma” in the small container by mixing just enough water with red food coloring to make a very dark liquid. Set aside.

What to Do

1. Fill the 3 L bowl about halfway with hot water. Remove the gelatin from the refrigerator, and loosen it from the bowl by dipping the bowl briefly in the larger bowl of hot water.
2. Arrange the four bricks in a rectangle on the table so that they will be able to support the pegboard. Lay the pegboard on top of the bricks. Slide a tray or cookie sheet under the setup for collecting any drips, as shown in the diagram.
3. Unmold the gelatin by tipping the bowl over onto the center of the pegboard and lifting the bowl. Do this very carefully so that the gelatin cast won't develop cracks; a few small cracks are acceptable. The gelatin cast will spread and settle. It should resemble a colorless to milky volcano.



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4. Fill the syringe with your prepared "magma." Remove any air bubbles from the syringe by holding the syringe upright and squirting out a small amount of the liquid. Air tends to fracture the gelatin. Attach tubing to the syringe.
5. Tell students that you are now going to simulate the movement of magma through a volcano.
6. Insert the other end of the tubing into the center of the gelatin cast through a hole in the pegboard. Inject the red water very slowly, at a rate of about 20 cc/min, and have students watch carefully.
7. Ask students to describe what they observed. (*If the gelatin is fractured, the red dye will flow out of the fractures. If there are no fractures, the dye should flow out equally in all directions.*)
8. Refill the syringe several times. Compare the movement of the magma each time.
9. Use the knife to slice open the volcano, and view the cross-section. Tell students that in the gelatin, just as in a

volcano, the magma will follow the path of least resistance. When there is a fracture in the rock on the Earth's surface, the magma will flow out of the fractures. Otherwise, the magma flows in all directions.

Explanation

Lava is magma, or molten rock, that seeps through the Earth's surface. Underground, it travels through cuts or fractures in the rock. Vertical fractures in the surrounding rock fill with the magma, creating large sheets of moving molten rock called dikes. Similarly, in this demonstration the cracks in the gelatin fill with the red liquid and open as the pressure from the liquid increases.

Going Further

Prepare gelatin in a bread pan to compare the flow of dye in the bread pan with that in the round bowl. In this case, the magma will flow horizontally rather than vertically.