

Testing Lava Flows

The stickiness of a substance is called viscosity. When a liquid is described as highly viscous, it does not flow very well and is very sticky (like honey). Liquids that are not very viscous will flow quickly and be runny (like water).

The lava that erupts from an active volcano can vary in viscosity. This determines how explosive a volcanic eruption becomes. For example, when Mount St. Helens erupted in 1980, the lava was very viscous and thick, trapping gases in the molten rock. Those gases quickly expanded and caused an explosive eruption. In contrast, Hawaiian volcanoes produce more liquid and low-viscosity lava which doesn't trap gases and erupts gently.

The viscosity of lava also influences the shape of a volcano! Shield volcanoes are made of lava with the runny viscosity of ketchup, which produces wider, flatter volcanoes. Composite volcanoes are made of sticky lava with the viscosity of peanut butter, creating taller volcanoes.

Materials needed:

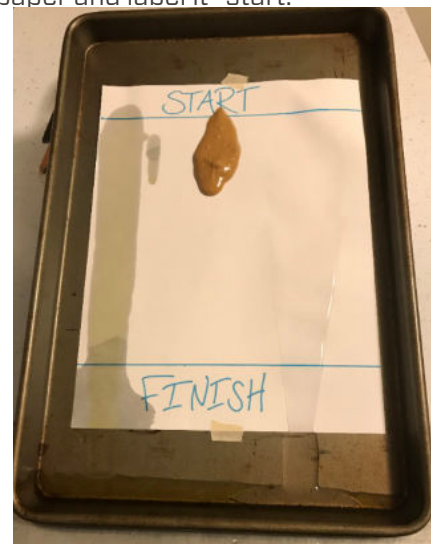
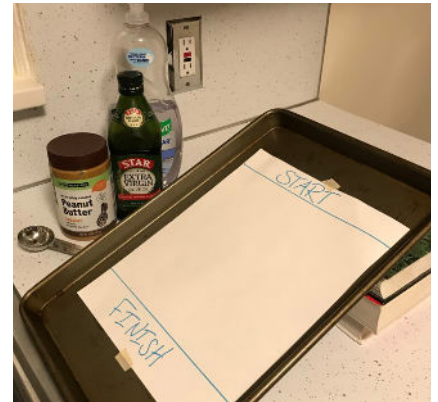
- Baking sheet
- Books
- Paper
- Ruler
- Tape
- Marker
- Tablespoon
- 3 liquids of different viscosities (e.g., honey, shampoo, oil, ketchup, soap, toothpaste, or peanut butter)
- Stopwatch

Step-by-step instructions:

1. Prop a baking sheet up at one end with 2 to 3 books.
2. Using the marker and ruler, draw a horizontal line across the top of a piece of paper and label it "start."
3. Measure 8 inches down, draw another line, and label it "finish."
4. Tape the paper to the baking sheet with the start line on the higher end.
5. Measure one tablespoon of your first liquid onto the start line.
6. Using a stopwatch, time how long it takes for the first liquid to reach the finish line and record the time on a separate piece of paper.
7. Repeat steps 5 through 7 with the other liquids of different viscosities.

Additional explorations:

- Temperature can change the viscosity of a substance. Try heating up one of your test liquids in a microwave-safe bowl. Once heated, time how long it takes to reach the finish line. Did the heated liquid travel faster or slower than it did before? What does this mean for its viscosity?





Testing Lava Flows (continued)

Discussion questions:

- What liquid was most viscous? Least viscous?
- When a volcano erupts with very viscous (runny) lava, do you think the volcano will erupt gently or explosively?
- How would you explain viscosity to a friend?
- Did some of your liquid soak into the paper? How might that affect your experiment?