CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
J1506

Project Title
Viscosity and Volcanoes

Abstract

Objectives/Goals
The question I asked is: Does temperature affect the viscosity of a liquid? Viscosity is defined as the resistance of a liquid to flow. The results of the experiments were related to volcanoes and how they are formed.

Methods/Materials
Two experiments were done to measure the viscosity of molasses and the affect of viscosity on the flow rate. The viscosity of molasses was measured at different temperatures using the falling rate of a steel ball in a column of molasses. the data were regressed to determine the viscosity at any temperature. then the flow rate of the molasses was measured on an incline at different temperatures.

Results
The result of these experiments show, that my hypothesis was correct. That the temperature does affects the viscosity of a liquid. The higher the temperature the less viscous the molasses. The less viscous the molasses the faster it flows away from the point of origin.

Conclusions/Discussion
The experiments showed that temperature affects the viscosity of molasses and the flow rate is dependent on viscosity. The results of the experiments explain how the composition of lava controls the shape of the volcano it makes. Basalt lava has a high temperature and a low viscosity and therefore a high flow rate. The high flow rate of basalt carries it quickly away from the vent and it spreads out over a large area and builds shield volcanoes with shallow slopes and thin lava flows. Andesite lava has an intermediate viscosity and temperature and therefore as moderate flow rate. The moderately high flow rate of andesite carries it less quickly away from the vent and spreads out a smaller area and builds a stratovolcano with steeper slopes and thick lava flows. Dacite and rhyolite lavas have low temperature and high viscosity and therefore has a low flow rate. The low flow rate of dacite and rhyolite carries it slowly away from the vent causing it to pile up and spread out a very small area and builds a dome volcano with very steep sides.

Summary Statement
My project measured the effect of temperature on the viscosity of molasses and explains how viscosity determines the shape of a volcano.

Help Received
My father helped with the design and running of the experiments. My mother helped with the calculations and editing of the report. I borrowed some equipment from my science teacher.