

A Land of Volcanic Unrest

Millions of years ago, volcanic eruptions shoved gigantic mountains up out of the ocean. The tops of these mountains became the islands of Japan. Mountains run down the middle of every island in Japan, covering approximately three-quarters of the land. The largest island, Honshu, contains most of Japan's highest mountains, including the famous Mount Fuji.

Like most of Japan's mountains, Mount Fuji is a volcano. Although it has not erupted since 1707, about 70 of Japan's other volcanoes are currently active and pose a threat to the country. The world's largest volcano, Mount Aso, is on the southern island of Kyushu.

Scientists in Japan study many aspects of their volcanoes, including lava viscosity. Viscosity is a liquid's internal friction or ability to flow fast or slow. Water is a liquid with low viscosity, and so it flows freely. Liquids such as honey and maple syrup both have high viscosity, making them thick and slow moving. By studying the viscosity of lava, scientists can determine how dangerous an active volcano might be. It is the amount of silica in the lava that determines its viscosity. A volcano with small amounts of silica has a low viscosity. It is swift moving and able to destroy surrounding areas quickly without much time for evacuation. The more silica in the lava, the thicker and slower it flows.

By studying the lava viscosity, scientists can also determine the type of volcano that will be formed. For example, the lava from Mount St. Helens is highly viscous, and so the slow-moving lava created a steep-sided volcano. On the other hand, the lava found in the Hawaiian Islands is thin and swift moving, creating flat volcanoes.

Try This Experiment

1. Gather four clear household liquids with a variety of viscosity (cooking oil, vinegar, shampoo, liquid soap, corn syrup, molasses, honey, baby oil, etc.).
2. Pour the same amount of each liquid into four tall, clear beakers or graduated cylinders. Label the beakers A, B, C, and D. Imagine the four samples are lava taken from four different volcanoes in Japan. It is your job as the scientist to test the lava viscosity and report to the public the dangers posed by each volcano.
3. Use a stopwatch and four marbles to test the lava's viscosity and record your findings on the charts on page 54. Begin with sample A. Describe the liquid and then time how long it takes for a marble to drop through the liquid to the bottom of the container. Record your finding on the chart. Based on the speed of the marble, predict the amount of silica in this lava sample and record your prediction on the chart by placing an "X" along the scale and drawing a picture of the volcano that would be formed.
4. Continue this procedure with the three other lava samples. Then make a report to the people living in the areas around each of the volcanoes. What kind of warning would each receive?

Sample A _____

Sample B _____

Sample C _____

Sample D _____

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Viscosity Data Sheet

<p style="text-align: center;">Sample A</p> <p>Describe the lava sample.</p> <p>_____</p> <p>Viscosity rating in _____ seconds</p> <p>Circle the amount of silica in this lava.</p> <p>More Silica Less Silica</p> <p>_____</p> <p>Draw an illustration of the kind of volcano that might have this type of lava.</p>	<p style="text-align: center;">Sample B</p> <p>Describe the lava sample.</p> <p>_____</p> <p>Viscosity rating in _____ seconds</p> <p>Circle the amount of silica in this lava.</p> <p>More Silica Less Silica</p> <p>_____</p> <p>Draw an illustration of the kind of volcano that might have this type of lava.</p>
<p style="text-align: center;">Sample C</p> <p>Describe the lava sample.</p> <p>_____</p> <p>Viscosity rating in _____ seconds</p> <p>Circle the amount of silica in this lava.</p> <p>More Silica Less Silica</p> <p>_____</p> <p>Draw an illustration of the kind of volcano that might have this type of lava.</p>	<p style="text-align: center;">Sample D</p> <p>Describe the lava sample.</p> <p>_____</p> <p>Viscosity rating in _____ seconds</p> <p>Circle the amount of silica in this lava.</p> <p>More Silica Less Silica</p> <p>_____</p> <p>Draw an illustration of the kind of volcano that might have this type of lava.</p>