# Measuring Lava Flow Worksheet

**Goals:**
- To measure and understand how volume, viscosity and slope affect the flow of fluid.
- To apply understanding of factors that control lava flows and other liquids.

**Viscosity Procedure Part 1: Experiment and Data Collection**      viscosity group

1. Write a hypothesis based on the following question:

   **What is the relationship between viscosity of a liquid and the surface area it covers?**
   Hypothesis: _____

   _____

   _____

2. Place an overhead transparency of a grid on a flat surface.

3. Make the four following mixtures: 3 ml liquid soap, 3 ml soap plus 1 cap full of salt (mix well), 2 ml soap and 1 ml of water (mix well), 3 ml water

4. One at a time, pour the three mixtures on the transparency (space them out). Pour the fourth (water only) carefully or use an eyedropper.

5. When the soap stops flowing, measure the area of the flow.

6. Make a data table below and record your data in it.

**Viscosity Procedure Part 2: Data Sharing and Summary**

1. Record your data on the board for the class.

2. Summarize the results from the class below (what is the relationship between surface area and slope, volume and viscosity of a liquid?).

3. Was the hypothesis that **<u>your</u>** group tested correct?      _____

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**Goals:**
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**Volume Procedure Part 1: Experiment and Data Collection**     *volume group*

1. Write a hypothesis based on the following question:

   **What is the relationship between volume of a liquid and the surface area it covers?**
   Hypothesis: _____
   _____
   _____

2. Place an overhead transparency of a grid on a flat surface.

3. One at a time, pour the following three volumes of liquid soap on the transparency (space them out): 3 ml soap, 6 ml soap, 9 ml soap.

4. When the soap stops flowing, measure the area of the flow.

5. Make a data table below and record your data in it.

**Volume Procedure Part 2: Data Sharing and Summary**

1. Record your data on the board for the class.

2. Summarize the results from the class below (what is the relationship between surface area and slope, volume and viscosity of a liquid?).

3. Was the hypothesis that **<u>your</u>** group tested correct?        _____

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**Goals:**
- To measure and understand how volume, viscosity and slope affect the flow of fluid.
- To apply understanding of factors that control lava flows and other liquids.

**Slope Procedure Part 1: Experiment and Data Collection**

<span style="color:green">slope group</span>

1. Write a hypothesis based on the following question:

   **What is the relationship between slope of a surface and the surface area it covers?**
   Hypothesis: _____
   _____
   _____

2. Place three overhead transparencies of a grid on your desk. Lay one transparency flat, place a thin dowel under the middle of the second, and place a pencil under the middle of the third.

3. Pour 3 ml of liquid soap onto the middle of each transparency.

4. When the soap stops flowing, measure the area of the flow.

5. Make a data table below and record your data in it.

**Slope Procedure Part 2: Data Sharing and Summary**

1. Record your data on the board for the class.

2. Summarize the results from the class below (what is the relationship between surface area and slope, volume and viscosity of a liquid?).

3. Was the hypothesis that **<u>your</u>** group tested correct?         _____

**Part 3: Geochemical Engineering Solutions**

*Congratulations!* Your team was just hired as geochemical engineers to figure out one or more ways to stop, slow down or divert (change the direction of) lava flows in order to save human settlements (houses, towns, cities, structures, etc.) near active volcanoes. Use what you learned from your experiment to come up with ways to achieve this goal. Use any other knowledge that you have about liquid movement.

Brainstorm within your group and write out your ideas in the space below. Also draw out any of your plans. At this stage, do not worry about how much money your solution will cost or how hard it might be to achieve. **Be creative!**