Teacher Page

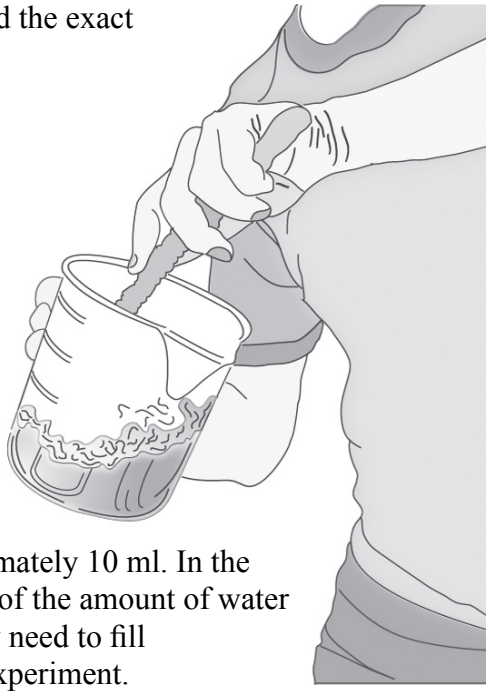
Lahar in a Jar

Instructions: *Follow the procedures below to make a small lahar in a jar.You will mix known volumes of rock debris and water. Give your mixed lahar a run down a gutter or board provided by your teacher.* ***Answers provided on the teacher page are derived from a trial run with the mixture of lahar material noted in the lahar recipe. Answers will vary, depending upon your sample's clay content, compaction, density, and moisture content.***

1. Place approximately 400 milliliters of "lahar" into a beaker. Break up any large clumps of dirt and debris. Record the exact volume here.

ANSWER:

400 ml



2. Make a prediction. How much water will be necessary to set the rock debris sample into motion as a small, in-the-jar lahar? 10 ml? 100 ml? Record your prediction.

ANSWER:

20 ml in this trial run

3. During this experiment, you will pour water into the beaker repeatedly, in increments of approximately 10 ml. In the space below, develop a procedure for keeping track of the amount of water that you tip during successive pours. *Note:* You may need to fill the graduated cylinder more than once during this experiment.

Students might choose to keep track of water increments added, or subtract the final reading from the top reading. Students will need to fill the graduated cylinder more than once during this experiment.

4. Pour water into the beaker in increments of approximately 10 ml. Stir the lahar rocks and water with a spoon or a stick after each addition of water. Tilt the beaker and gently rotate it sideways to observe if the mixture "flows" around the jar sides as a lahar would move. Repeat as much as necessary, and test for flowing. When the mixture begins to flow, STOP! Add no more water! Note that the mixture first appeared as dry dirt, but with the addition of water, has changed to the consistency of cookie dough and now resembles thick cake batter.

In this trial run, we added 130ml of water before the mixture began to "flow" when the beaker was rotated.

Teacher Page

Lahar in a Jar-continued

5. Compare the total volume of water to the cumulative volume of lahar rocks and water. Use the space below to calculate the percent water required to form a lahar in the beaker. Record your result here.

ANSWER:

25 percent water but answer will range from 20-40 percent

6. Determine whether the actual percent of water required to make a lahar is more or less than your prediction.

ANSWER:

In this trial run, the actual value exceeded the predicted value.

7. After completion of this experiment, preserve your sample for its run down a gutter or board as provided by your teacher. Explain why the slopes of Cascade volcanoes are an ideal location for the development of debris flows and lahars.

ANSWER:

There is an abundance of surface water and loose volcanic rocks on the steep slopes of Cascade stratovolcanoes.

8. Describe or draw a diagram of the energy transformations that happen as a lahar rushes down the flanks of a volcano and comes to rest.

ANSWER:

The rock debris embedded within riverbeds and embankments holds potential energy Kinetic energy is released as the debris flow or lahar mobilizes the rock debris and carries it down valley.