Lava Supply

Overview:

Once an eruption starts, its progress can be monitored in several ways. One common way to monitor an eruption is by determining lava supply. In this activity, students will calculate lava supply based on depth, width, and velocity measurements of actual lava flows.

Cultural Tie

Since ancient times Hawaiians have made use of the lava tubes on their islands. The tubes have been used as burial sites, as shelter from storms and battles, and to capture water as it condensed at the mouth of the tube.

Objective:

The student will:

- calculate the lava supply for three lava flows;
- understand that a wide, deep lava tube with fast-moving lava flowing through it carries more lava than a narrow, shallow lava tube with slow moving lava flowing through it; and
- understand how scientists monitor lava supply.

Materials:

- Calculators
- Student Worksheet: "Lava Supply"

Activity Procedure:

1. Explain to students that the progress of an eruption can be monitored by measuring the amount of lava coming out on the surface.
2. After lava emerges, it cools and hardens on the outside, creating a network of tubes through which molten lava can flow. Lava is supplied to the front of the flow through this network of tubes. Scientists can measure lava supply through skylights in lava tubes.
3. During this lesson, students will calculate lava supply using the same equation scientists use.
4. Distribute calculators and the Student Worksheet: "Lava Supply" to each student. Explain that lava supply can be calculated using the following equation:

   Depth x Width x Velocity = Lava Supply

5. Ask students to look at the chart on the Student Worksheet: "Lava Supply." Demonstrate how to calculate lava supply for the first lava flow using the information in the chart.
6. Ask students to use their calculators to determine the lava supply for each lava flow, then complete the chart and the questions that follow. Discuss their answers as a class.

Answers to Student Worksheets:

1. 2.046 m^3/sec (may be rounded to 2.05 m^3/sec)
2. 1.197 m^3/sec (may be rounded to 1.20 m^3/sec)
3. 0.832 m^3/sec (may be rounded to 0.83 m^3/sec)
4. Lava Flow #1
5. False. Explanations will vary

Name: _____ **Student Worksheet**

Lava Supply

Directions: The progress of an eruption can be monitored by measuring the amount of lava coming out on the surface. After lava emerges, it cools and hardens on the outside, creating a network of tubes through which molten lava can flow. Lava is supplied to the front of the flow through this network of tubes. Scientists can measure the lava supply through skylights in lava tubes. They calculate lava supply using the following equation:

Depth x Width x Velocity = Lava Supply

Use this equation to calculate the lava supply for each of the lava flows in the chart. Write your answers in the last chart column, then answer the questions below.

		Depth (in meters)	x	Width (in meters)	x	Velocity (in meters/second)	=	Lava Supply (in meters^3/second)
1.	Lava Flow #1	0.6 m	x	1.1 m	x	3.1 m/sec	=	_____m^3/sec
2.	Lava Flow #2	0.3 m	x	2.1 m	x	1.9 m/sec	=	_____m^3/sec
3.	Lava Flow #3	0.8 m	x	0.8 m	x	1.3 m/sec	=	_____m^3/sec

4. Which lava flow carried the most lava? _____

5. Analyze the statement below. Determine if it is true or false and explain your answer.

   A shallow, narrow lava tube with slow moving lava flowing through it carries more lava than a deep, wide lava tube with fast-moving lava flowing through it.

   _____

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