Teacher Instruction Guide: Lava Zone Worksheet

<u>Objective:</u> Introduce and understand the USGS Lava-Flow Hazard Zone Map to connect lava presence with land topography. Research ways to mitigate human risk to volcanic activity on Hawai'i.

NGSS: 4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

<u>HĀ</u>: Strengthened Sense of Belonging Strengthened Sense of Responsibility Strengthened Sense of Aloha Strengthened Sense of Hawai'i

<u>Materials Needed</u>: Pencil, Coloring pencils/Crayons (8 different colors) <u>Time Estimate: 30 minutes</u>

Procedure:

1. GUIDED ACTIVITY: Distribute worksheet, 1 per student. Distribute crayons/colored pencils.

Students will use the numbering system and coloring guide to create a lava zone hazard map. The reference map is located on the teacher copy of the worksheet.

- 2. GUIDED ACTIVITY: Part 2. Project (or print multiple copies for groups to look at) the *Drive Map of the Island of Hawai'i*. Have students identify the locations of the 3 circled towns, then individually draw X's on their personal maps for the approximate locations of each town. Ask students to identify which lava zone each town is in.
- 3. EXTENDED ACTIVITY: For students who live on the Island of Hawai'i, ask them to identify other areas familiar to them and which lava zones they are in. *E.g. their school, homes*.

Directory:

Page 1 – Teacher Instruction Guide

Page 2 – Student Worksheet

Page 3 – Teacher Copy of Worksheet (with answers)

Page 4 – Drive Map of Hawai'i Island

Page 5 – USGS Lava-flow Hazard Zone Map Key

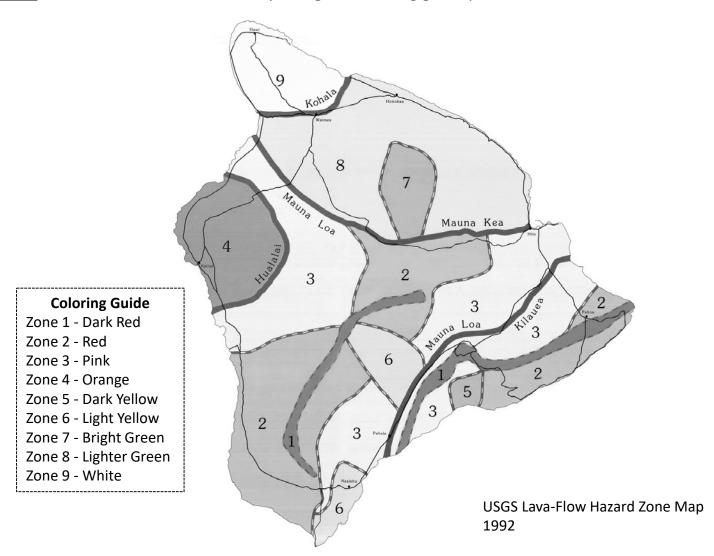
Additional Resources:

https://volcanoes.usgs.gov/observatories/hvo/fag lava.html

Living in Lava-Flow Hazard Zones

What are Lava-Flow Hazard Zones? This Lava-Flow Hazard Zone Map was developed by scientists to show the probability of lava flowing through different land areas. The Island of Hawai'i has nine lava hazard zones. The zones, ranked from 1 through 9, show the different risk levels on the island.

Part 1. Color the Island of Hawai'i map using the coloring guide provided.



<u>Part 2.</u> Using the drive map, draw an X on the towns of Kailua-Kona, Hilo, and Hāwī. Which lava zones are they located in?

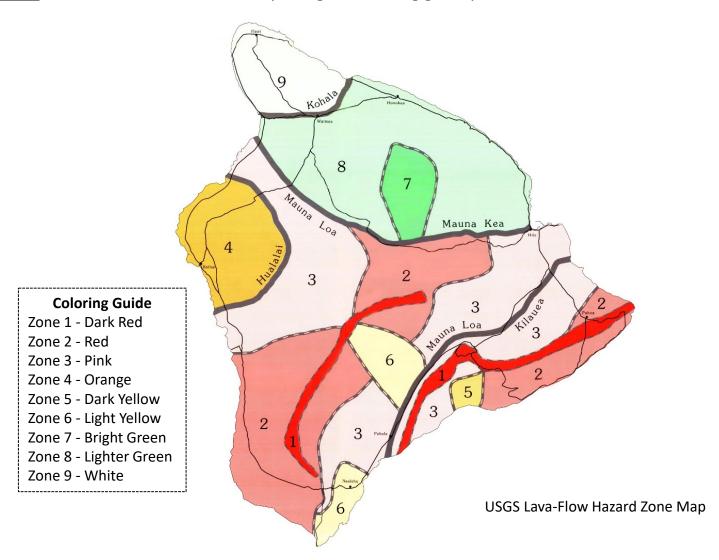
Kailua-Kona is in Lava Zone	
Hilo is in Lava Zone	
Hāwī is in Lava Zone	

Lava Zone 1 is dangerous because it is a specific volcanic feature. Do you know what feature it is?

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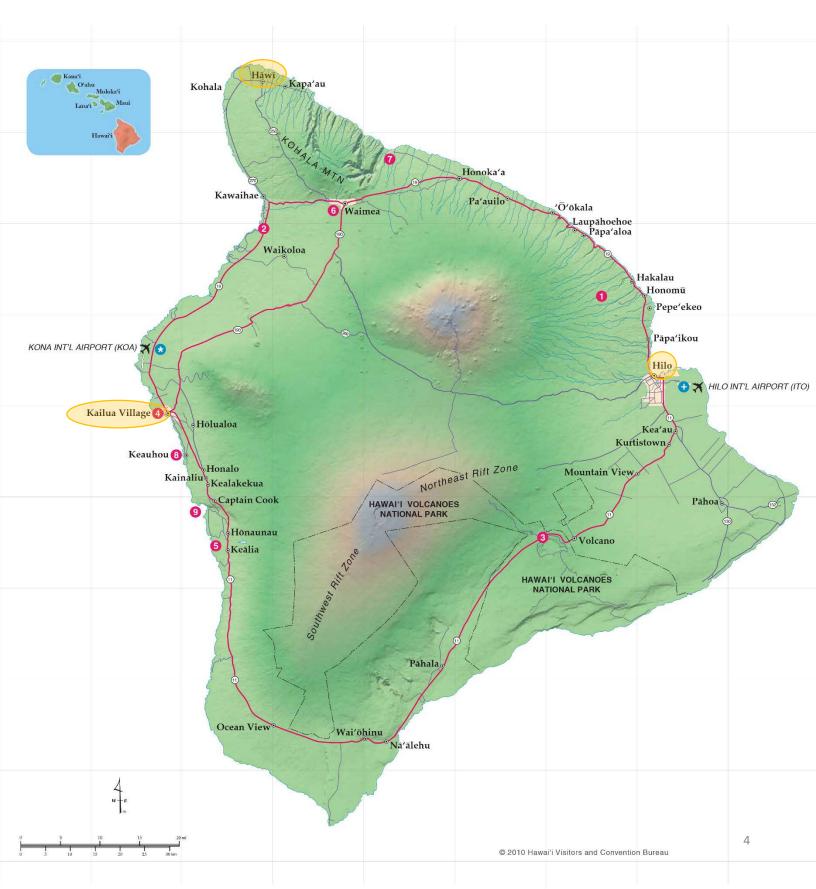
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Kailua-Kona is in Lava Zone _	_4
Hilo is in Lava Zone <u>3</u>	
Hāwī is in Lava Zone 9	

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Island of Hawai'i Drive Map

Refer to the map you have colored for lava zones and draw an X on the approximate locations of Kailua-Kona, Hilo, and Hāwī, which are circled and highlighted on the map.



Supplementary Material for Part 1.

USGS Lava-flow Hazard Zone Map Key

Volcano

MISCELLANEOUS FIELD STUDIES
MAP MF-2193

EXPLANATION

Lava-flow hazard zones—Based on location of eruptive vents, past lava coverage, and topography

		1	Zone 1—Includes summits and rift zones of Kilauea and Mauna Loa, where vents have been repeatedly active in historical time			
	ırd	2	Zone 2—Areas adjacent to and downslope of zone 1. Fifteen to twenty-five percent of zone 2 has been covered by lava since 1800, and 25 to 75 percent has been covered within the past 750 years. Relative hazard within zone 2 decreases gradually as one moves away from zone 1			
		3	Zone 3—Areas less hazardous than zone 2 because of greater distance from recently active vents and (or) because of topography. One to five percent of zone 3 has been covered since 1800, and 15 to 75 percent has been covered within the past 750 years			
severity		4	Zone 4 —Includes all of Hualalai, where the frequency of eruptions is lower than that for Kilauea or Mauna Loa. Lava coverage is proportionally smaller, about 5 percent since 1800, and less than 15 percent within the past 750 years			
Increasing severity	of hazard	5	Zone 5—Area on Kilauea currently protected by topography			
Inci		6	Zone 6—Two areas on Mauna Loa, both protected by topography			
		7	Zone 7—Younger part of dormant volcano Mauna Kea. Twenty percent of this area was covered by lava in the past 10,000 years			
		8	Zone 8—Remaining part of Mauna Kea. Only a few percent of this area has been covered by lava in the past 10,000 years			
		9	Zone 9—Kohala Volcano, which last erupted over 60,000 years ago			
Boundaries—Approximately located and gradational						
Lava-flow hazard zone 1						
Lava-flow hazard zones 2 through 9						