Bumpass Hell Field Trip Guide –

Student Observations

Lassen Volcanic National Park

# Introduction

Imagine you are a scientist, here to discover, observe, and record the geological processes found in and around Bumpass Hell hydrothermal area. You have binoculars, a non-contact electronic thermometer and your observational skills to help you.

# At the Bumpass Hell Trailhead (just off the parking lot)

1. There are volcanic rocks (Brokeoff Andesite) just to the left and there is also a massive rock (made of dacite) back at the far end of the parking lot. The rocks are not all the same. How did the big rock get there, since it’s unlike any of the surrounding rock?
2. Mount Tehama (some call it Brokeoff Volcano) used to be 4,000-5,000 feet above your head. Where is it now? What do you think happened to most of it? (hint: the same process that affected the big rock placement also affected Mount Tehama.)

# Along the Trail

1. Notice the broken-up rock that has fallen in this area. The rocks were hot lava that cooled and cracked. Water seeped into the cracks, froze, and pushed the rocks apart. Water can move through the rocks easily now. How does this relate to the hot water in the Bumpass Hell basin?

1. Stop at the large overlook area about 0.5 miles along the trail. The Sierra Nevada mountain range is in the distance to the right. This is the starting point for the Sierra Nevada, which is different than the Cascade Range of volcanoes that Lassen is a part of. How are the two ranges different from each other?

# High Basin Overlook

1. You are about to drop down into the Bumpass Hell basin. This is part of what remains from an ancient volcano, Bumpass Mountain. What part of the volcano are you about to walk down into?

## Heading Downhill

## You will come to a trail that branches off to the left. Take the trail to the left.

1. If you stop about halfway down the trail and listen, you can hear hot steam escaping a hole in the ground nearby. The temperature record for this area is 284°F. Water boils at 212°F at sea level. Usually, higher altitude means lower boiling temperature. What is your guess, as to what is at work here, to account for the two temperature differences?

# At the Basin Overlook

1. There are many fumaroles here. A fumarole is a small vent that releases volcanic gas from underground. Most fumaroles here in Bumpass Hell basin vent steam and gases into puddles of ground water. How many fumaroles do you see?

# On the Boardwalk

## Stay only on the boardwalk and do not go off for any reason. Any water here can be very hot and/or highly acidic. The surface is very thin in places and will not support your weight (Mr. Bumpass severely burned his leg as he broke through the surface).

1. Use the non-contact thermometer to measure the temperature of at least 3 fumaroles/mud pots/boiling springs along the boardwalk. What is the highest temperature you found? What type of feature was it?
2. In the basin you can see numerous colored features on the surface. Fill out the table with what you observe. The first line is filled out already with one observation.

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| **Colors I Observe**  **(each entry is for a different color)** | **Where I found it (near what feature?)** | **What I think makes the colors** |
| *An example is the White soil, (bleached look of all soil in the basin)* | *All soil in the basin* | *Some sort of chemical reaction with soil and gases from underground.* |
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