

ERUPTIVE HISTORY OF LASSEN VOLCANIC NATIONAL PARK CREATING A TIMELINE

SUMMARY: In this activity students will become familiar with the eruptive history of Lassen Volcanic National Park by reading a story and then developing a timeline of the park's volcanic history.

GOAL: To increase student awareness of the volcanic history of the park.

OBJECTIVES: By the end of the activity, students will be able to develop a brief, but accurate timeline of Lassen Volcanic National Park's eruptive history.

GRADE LEVEL: Fourth, through Twelfth

TIME REQUIRED: 45 to 60 minutes

SETTING: Classroom

MATERIALS: Each student will need a copy of the handouts "Eruptive History of Lassen Volcanic National Park: Creating a Timeline" Before and After Lassen Peaks 1914 Eruption, twelve 2" x 4¼" strips of white art paper, glue sticks, colored pens and pencils and/or crayons, and two pieces of 8½"x14" plain white paper.

INSTRUCTIONAL SEQUENCE: Introduce the activity by explaining that each student will read the handouts about the eruptive history of Lassen Volcanic National Park. Explain that they will be responsible for looking for key pieces of information that will be used in the development of two timelines, one for before and another for after Lassen Peak's 1914 eruption. Show the students the strips of art paper and explain that they will be writing their timeline information on them. It is suggested that you create one or two sample timelines to help the younger students understand the concept of a timeline.

Give copies of the handouts "Eruptive History of Lassen Volcanic National Park: Creating a Timeline" Before and After Lassen Peaks 1914 Eruption to each student. Have each student read the stories. The students need to look for key dates and information that will help them develop two accurate timelines. Each timeline strip must contain text that depicts the information they gathered from the reading. Use six strips for each timeline. Students glue finished timeline strips to the 8½"x14" white paper. Students may color and draw pictures above each timeline strip.

EVALUATION/ASSESSMENT: Evaluate by using the **Reporting of Information Rubric**. Also use the “Eruptive History of Lassen Volcanic National Park: A Chronological Timeline” included at the end of this activity as an aid in evaluating the student work.

Reporting of Information Rubric

The primary focuses are attention to detail and accurate reporting of information related to the eruptive history of Lassen Volcanic National Park.

- 4 Timelines demonstrate an in-depth understanding of historical eruptive events that occurred in Lassen Volcanic National Park. Eruptive events featured are in the correct chronological order and are described accurately.
- 3 Timelines demonstrate an acceptable understanding of historical events that occurred in Lassen Volcanic National Park. Eruptive events are featured in the correct chronological order. The written descriptions lack detail but are accurate.
- 2 Timelines demonstrate limited understanding of the historical events that occurred in Lassen Volcanic National Park. Eruptive events are featured, but one or more of the events may be out of chronological order. The written descriptions may lack detail and may not be accurate.
- 1 Timelines demonstrate extremely limited understanding of the historical events that occurred in Lassen Volcanic National Park. Eruptive events may be featured, but they are out of chronological order and may lack organization. The descriptions are poorly written.

Eruptive History of Lassen Volcanic National Park Creating a Timeline Before Lassen Peak's 1914 Eruption

Lassen Volcanic National Park has a long history of volcanoes and volcanic eruptions. Many people think of Lassen Peak as “The Volcano” of Lassen Volcanic National Park when in fact every mountain in the Park is a volcano or part of a volcano. Lassen Peak is just one of many volcanoes that occupy the area designated as Lassen Volcanic National Park.

Between 600,000 and 470,000 years ago a large composite or stratocone volcano called Mount Tehama formed in the southwest portion of what is the Park today. It towered over the area for many centuries. It slowly went extinct and eroded away into its present form with Brokeoff Mountain, Mount Diller, Mount Conard, and Pilot Pinnacle left as reminders of this once great volcano of the past. The Sulphur Works hydrothermal area is where the central vent of old Mount Tehama is thought to have been.

After the extinction of Mount Tehama, a number of lava dome volcanoes (sometimes called plug domes) began to erupt northeast of Mount Tehama between 300,000 and 200,000 years ago. These lava dome volcanoes are familiar landmarks in the Park. They include Ski Heil Peak (244,000 years ago), Bumpass Mountain (about 232,000 years ago), and Reading Peak (approximately 212,000 years ago). Other volcanoes including shield, cinder cone, and more lava domes erupted during the past 100,000 years to form the remainder of the volcanoes found in the Park. Two of these include Eagle Peak (66,000 years ago) and Hat Mountain (40,000 years ago).

Lassen Peak was formed 27,000 years ago. It probably took only a few years to reach its present height. With a height of 2,000 feet from its base and a volume of half a cubic mile, it is one of the largest lava domes on Earth. When Lassen Peak formed, it was probably very steep-sided and covered with rock talus. However, from 25,000 to 18,000 years ago during the last ice age, glaciers altered Lassen's shape. The glacial erosion gouged a bowl-shaped depression on the volcano's northeast flank, called a cirque.

Approximately 1,100 years ago six lava dome volcanoes collectively known as the Chaos Crags Volcanoes were formed in a series of violent eruptions north of Lassen Peak near Manzanita Lake. The volcano called “Cinder Cone” with its Fantastic Lava Beds and Painted Dunes formed in a series of eruptions about 350 years ago. This spectacular volcano is located near Butte Lake in the northeastern part of Lassen Volcanic National Park

Eruptive History of Lassen Volcanic National Park Creating a Timeline After Lassen Peak's 1914 Eruption

On May 30, 1914 Lassen Peak awoke from its 27,000 year-long sleep when it was shaken by a steam explosion. By mid-May 1915 more than 180 steam explosions had blasted out a 1,000 foot-wide crater near the summit of Lassen Peak. Steam explosions or steam blasts occur when molten rock (magma) rises toward the surface of a volcano and heats shallow ground water. The hot water rises under pressure through cracks and on nearing the surface, vaporizes and creates steam explosions.

On the evening of May 14, 1915 blocks of hot lava could be seen bouncing down the flanks of Lassen from as far away as the town of Manton, 20 miles to the west. Between May 14 and May 19 a new lava dome formed in the crater. Late in the evening of May 19, a large eruption shattered the new lava dome sending large blocks of hot lava avalanching down the northeast flank of Lassen. This hot lava melted the large snow pack on the side of Lassen generating a mudflow of volcanic materials, called a lahar, down Lost Creek and Hat Creek. Also during the night of May 19-20, dacite lava erupted filling the new crater of Lassen, spilled over the low spots on its rim, and flowed 1,000 feet down the steep west and northeast flanks of the volcano.

Late in the afternoon of May 22, 1915 after two quiet days, Lassen Peak exploded in a powerful eruption that blasted rock fragments and pumice high into the air, creating the larger and deeper of the two craters seen near the summit of the volcano today. A huge column of volcanic ash and gas rose more than 30,000 feet into the air and was visible from as far away as Eureka, 150 miles to the west. The eruption generated a high-speed avalanche of hot ash, pumice, rock fragments, and gas, called a pyroclastic flow that swept down the side of the volcano, devastating a three square mile area. This pyroclastic flow also created a new lahar of melted snow and volcanic rock pieces that rushed down Lost Creek and Hat Creek. The May 22 eruption also generated additional smaller mudflows on all flanks of Lassen Peak.

For several years after the May 22, 1915 eruption, spring snow melt percolating down into Lassen Peak triggered steam explosions, indicating that rocks beneath the volcano's surface remained hot. Steam explosions in May 1917 blasted out the second of the two craters now seen near the volcano's summit. Steam vents could be found in the area of these craters into the 1950s but gradually died out. Today Lassen Peak sleeps again, but active steam vents, boiling springs, and bubbling pools of hot mud are still found elsewhere in Lassen Volcanic National Park. No one can say when, but it is almost certain that the Lassen area will experience volcanic eruptions again.

Eruptive History of Lassen Volcanic National Park A Chronological Timeline

The eruptive history of Lassen Volcanic National Park is listed below in chronological order.

- Between 600,000 and 470,000 years ago a large composite or stratocone volcano called Mount Tehama formed in the southwest portion of what is Lassen Volcanic National Park today.
- After the extinction of Mount Tehama, a number of lava dome (sometimes called plug dome) volcanoes began to erupt to the northeast of Mount Tehama between 300,000 and 200,000 years ago. These included Ski Heil Peak (244,000 years ago), Reading Peak (212,000 years ago), and Bumpass Mountain (232,000 years ago).
- Other volcanoes including shield, cinder cone, and more lava domes, erupted during the past 100,000 years to form the remainder of the volcanoes found in the Park. Two of these include Eagle Peak (66,000 years ago) and Hat Mountain (40,000 years ago).
- Eruptions about 27,000 years ago formed Lassen Peak, probably within only a few years.
- The Chaos Crags Volcanoes formed about 1,100 years ago.
- Cinder Cone with its Fantastic Lava Beds and Painted Dunes formed approximately 350 years ago.

Lassen Peak History, 1914 to Present

- On May 30, 1914 Lassen Peak awoke from its 27,000 year-long sleep when it was shaken by a steam explosion.
- By mid-May 1915, more than 180 steam explosions had blasted out a 1,000 foot-wide crater near the summit of Lassen Peak.
- On the evening of May 14, 1915 blocks of hot lava could be seen bouncing down the flanks of Lassen from as far away as the town of Manton, 20 miles to the west.
- Between May 14 and May 19, 1915 a lava dome formed in the crater.
- Late in the evening of May 19, 1915 a large eruption shattered the new lava dome in the crater sending large blocks of hot lava avalanching down the northeast flank of Lassen. This hot lava melted the large snow pack on the side of Lassen generating a mudflow of volcanic materials, called a lahar, down Lost Creek and Hat Creek.
- During the night of May 19-20, 1915 dacite lava, somewhat more fluid than the lava dome, filled the new crater of Lassen, spilled over the low spots on its rim, and flowed 1,000 feet down the steep west and northeast flanks of the volcano.
- Late in the afternoon of May 22, 1915 after two quiet days, Lassen Peak exploded in a powerful eruption that blasted rock fragments and pumice high into the air, creating the larger and deeper of the two craters seen near the summit of the volcano today. A huge column of volcanic ash and gas rose more than 30,000 feet into the air and was visible from as far away as Eureka, 150 miles to the west. The eruption generated a high-speed avalanche of hot ash, pumice, rock fragments, and gas, called a pyroclastic flow that swept down the side of the volcano, devastating a three square mile area. This pyroclastic flow also created a new lahar of melted snow and volcanic rock pieces that rushed down Lost Creek and Hat Creek.
- For several years after the May 22, 1915 eruption, spring snow melt percolating down into Lassen Peak triggered steam explosions, indicating that rocks beneath the volcano's surface remained hot.
- Steam explosions in May 1917 blasted out the second of the two craters now seen near the volcano's summit.
- Steam vents could be found in the area of these craters into the 1950s but gradually died out.
- Today Lassen Peak sleeps again, but active steam vents, boiling springs, and bubbling pools of hot mud are still found elsewhere in Lassen Volcanic National Park.

