

## 96 CSO Road Scholars Event

## Lassen Volcanic National Park

Participants: \_\_\_\_\_ and \_\_\_\_\_



The day had started out like most others at Central High School. I had just made it through the classroom door when the bell rang for first period classes to begin. As usual, last night's basketball scores were read, followed by several other announcements of little interest to me. Midway through, I was stunned to hear my name. I was being asked to report to the counselor's office immediately!

Upon arrival, I was asked to take a seat and informed that the counselor would be with me in just a moment. For the life of me, I could not figure out why I was there.

Soon the counselor arrived. After a few minutes of casual conversation, she asked whether I could recall a conversation we had had earlier that year concerning my plans to study earth sciences at CU

at Colorado Springs. As a favor and without my knowledge, she had recommended me for a special field study on volcanoes. I listened in a daze as she shared that I had been chosen to accompany a CU professor and several other gifted high school science students to Lassen Volcanic National Park in Northern California this summer. She did add that this depended upon whether I was still interested in working toward a degree in the earth sciences. Wow, was I!

She then handed me a packet of information including a California Highway Map and a couple of topographic maps. I have to admit that my mind was not on academics that day. I could hardly wait to spend some time discovering as much as I possibly could about Lassen Volcanic National Park, and I intended to start the very moment I got home! Before leaving school that day, I checked out several books on volcanoes.

Since I had never ever in my entire life even heard of Lassen Volcanic National Park, I first took out the California Highway Map.

1. Scanning the California highway map, I spotted the heading "National Parks and Monuments". What letter-number combination, or grid coordinate, would help me to quickly locate Lassen Volcanic National Park on the large highway map?

- California is so large that it has been divided into a number of regions on this high-way map. In which region is Lassen Volcanic National Park located?
- According to this inset, which peak within the boundaries of Lassen Volcanic National Park is highest in elevation?
- What is the elevation of that peak?
- What trail passes directly through Lassen Volcanic National Park?

Before turning to the topographic maps, I browsed through the library books. I found it interesting that a volcano's angle of slope can help one determine whether it is a cinder cone, shield or composite volcano.

<u>Volcano Type</u>	<u>Angle of Slope</u>
Shield Volcano	0° to 10°
Composite	10° to 20°
Cinder Cone	20°+

I was also fortunate to discover a table to convert slope gradient to slope angle.

Gradient [Feet/Mile]	Slope Angle [Degrees]
0	0
460	5
920	10
1370	15
1800	20
2230	25
2640	30
3030	35
3390	40
3730	45
4040	50

I also found that I needed the formula for calculating gradient in feet per mile.

$$\text{Gradient between two points} = \frac{\text{Difference in elevation between two points [feet]}}{\text{Distance between two points [miles]}}$$

6. I first located Cinder Cone near the center of the Prospect Peak Quadrangle. From its highest point, of 6907 feet, I determined the distance along its northern face to the 6400 foot contour line. What is the difference in elevation from its summit to base?
7. I also determined the distance between these two points to the nearest tenth of a mile. Record this distance.
8. Using the calculations recorded in numbers 6 and 7 above, calculate and record the gradient in feet per mile.
9. Consult Table II to determine the angle of slope and re-cord here. Your angle of slope should agree with that of a cinder cone given in Table I.

Since I had successfully identified Cinder Cone as an actual cinder cone volcano, I proceeded to calculate the angle of slope for yet another volcano featured on the Prospect Peak Quadrangle — Prospect Peak itself. This time I calculated the slope gradient from its highest elevation, 8338 feet, directly Northward until it crossed the 6400 foot contour.

10. Calculate the difference in elevation from summit to base in feet.
11. Measure the difference between these two “points” to the nearest tenth of a mile.
12. Using the calculations recorded in numbers 10 and 11 above, calculate and record the gradient in feet per mile.
13. Consult Table II to determine the angle of slope and record here.
14. According to your calculations and Table I, what kind of volcano is Prospect Peak?

I found that I really enjoyed working with topographic maps and was eager to learn even more. I became especially intrigued with the large Lassen Volcanic National Park and Vicinity, California, topographic map.

From my previous studies of 7.5-minute quads, I knew that townships were divided into thirty-six one-mile by one-mile sections. I first located the Section labeled “1” nearest the upper right hand-corner. I traveled Westward to Section 6, Southward to 7; Eastward to 12, then Southward to 13 ... and continued until I had reached Section 36.

15. State the Township — Range coordinates for the Township I had just traced with my fingers.

I was also aware that individual Sections within Townships could be divided into quarters, halves, quarters of quarters, etc., and that these land designations were part of the Public Land Survey System or PLSS first established by Thomas Jefferson.

16. State the PLSS for the crater of Prospect Peak located in Sector 6 to the quarter of a quarter section.

I was already familiar with the Prospect Peak Quadrangle, but I wanted a more detailed “picture” of the area directly to the South of this quadrangle.

17. What 7.5-minute quadrangle displays the area directly West of the Prospect Peak Quadrangle?

18. What is the value of each contour interval appearing on Prospect Peak?

19. What is the value of each contour interval appearing on Mt. Harkness, adjacent to Juniper Lake?

I imagined that I had just climbed to the Lookout on Mt. Harkness and was enjoying its 360° panoramic view. [Range:  $\pm 2^\circ$ ]

20. State the **bearing** to the crater of Hat Mountain.

21. State the **bearing** to the summit of Mud Creek Butte[near the SE corner of the map].

22. State the **bearing** to the Northernmost island in Wilson Lake [lower map boundary, center].

From the Lookout on Mr. Harkness, I found it difficult to see Last Chance Creek, the small stream located near the lower right hand corner of Lassen Volcanic National Park and Vicinity.

23. Is this stream classified as **intermittent** or **perennial**?

24. In which general direction does Last Chance Creek flow?

25. Although I found it difficult to make out Last Chance Creek, I was able to see that it widened considerably. How is this widened area classified?

My time is up. I have to quit, otherwise I'll never have time for my “real” homework. I hope you enjoyed my ramblings through Lassen Volcanic National Park.

Name[s]: \_\_\_\_\_

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To purchase the USGS quads and highway maps to accompany this unit, please visit:

<http://www.otherworlds-edu.com>

**96 CSO Road Scholars Event, C-Div.**

**Answer Key**

1. E-7
2. Shasta-Cascade
3. Lassen Peak
4. 10,457 feet
5. Pacific Crest National Scenic Trail
6. 507 feet
7. 0.2 miles
8. 2,535
9. Range:  $29^\circ \pm 1^\circ$
10. 1938 feet
11.  $1.9 \pm 0.1$  miles
12. 969 - 1020 feet per mile
13.  $10.5^\circ - 11^\circ$
14. Composite
15. T. 31 N. R. 6 E
16. SE 1/4 SE 1/4 Sec. 6 T. 31 N. R. 6 E.
17. Manzanita Lake
18. 40 feet
19. 80 feet
20. N  $58^\circ$  W
21. S  $50^\circ$  E
22. S  $48^\circ$  W
23. Perennial
24. Southward
25. Submerged marsh or swamp

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