

Field Trip Workbook

G200 Field Studies—Sec 001 (Mt St. Helens north)

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Use this workbook to answer the following questions about the geology at the stops we will be making.

Please note that the stops below do not correspond exactly to the field guide prepared by another professor that has been made available to you on line. However, the field guide may be useful for answering some of the following questions.

Castle Rock. Exit 49 on I-5, start of drive on Hwy 504.

STOP 1- Silver Lake Visitor Center, 5.3 miles from I-5. Bathroom break & coffee. This will be your last chance for a bathroom until STOP 4.

STOP 2- road cut between mileposts 24-25, Hwy 504. Bus can stop on east side of shoulder. No bathroom.

Q1. Draw a sketch of features exposed in the roadcut on the north side of the road. Your sketch should show structural features.

Q2. What type of rock makes up this outcrop? What is the age of the rocks? How was the deposit formed?

Q3. Draw a cross-section of the slope stabilization built at this site. Your sketch should be oriented roughly north-south (perpendicular to the face of the road cut) and show relief (topography), including the cliff, road surface, and areas to the south. Indicate schematically which way material moved below the surface prior to slope stabilization.

STOP 3- viewpoint of Hoffstadt Creek Bridge, between mileposts 29-30, Hwy 504.

Turn off to parking area immediately west of the bridge, on the north side of the highway. No bathroom, but have information panels (best read from right to left).

Q4. This stop is at the edge of the “blast zone”. How has the vegetation recovered in this area (how tall are the trees)?

Q5. What geological problems were encountered when this bridge was built?

Q6. What is the name of the mechanically weak material found in the canyon and areas to the east? What is its origin?

STOP 4- Forest Learning Center, Weyerhaeuser Overlook, between mileposts 33-34, Hwy 504. Large parking area, bathrooms, gift shop. Possible LUNCH stop.

Q7. Describe the deposits at the bottom of the Toutle river valley (there are two different ones). What is their origin? Which came last, and how can you tell?

Q8. Draw a sketch of the road cut on the north side of the highway, making sure to indicate different color zones.

Q9. Why are there so many different colors and what do they represent?

STOP 5- road cut just past milepost 38, Hwy 504. No bathrooms.

Q10. What is the name of the prominent feature visible in the road cut and how did it form? Use words and sketches.

Q11. What evidence is there at this stop for slope failure? What mitigation efforts have been performed, and have they been successful?

STOP 6- Castle Lake Viewpoint, between milepost 40-41, Hwy 504. Large parking area, no bathrooms.

Q12. What type of deposit is in the Toutle river valley below Castle Lake, and how does it differ from that at Stop 4?

Q13. What is the relationship of Castle Lake to the deposits in the Toutle river valley?

Q14. Closer to the base of Mt. St. Helens, one can see the relatively flat Pumice Plain. What is the origin of this plain?

Q15. Notice the difference in vegetation from the south side of the road (within the national Monument) and that to the north. Why is there a difference?

STOP 7- road cut immediately after milepost 42, just east of the Maratta Creek Bridge, Hwy 504.

Q16. Draw a sketch of the rock features exposed in the road cut on the north side of the highway. Your sketch should show structural features and different rock units.

Q17. What evidence is there that lava was transported upwards in a fracture?

STOP 8- mouth of Coldwater Lake, milepost 45, Hwy 504. Parking area to north of highway, with picnic tables and restrooms. We will be walking about 100 m, onto a boardwalk that is constructed over the lake.

Q18. Give a brief synopsis of the geological history of the area. Your narrative should include pre-blast, early-post-blast, late-post-blast, and current periods. Geological features that formed during these periods should be mentioned.

Following this stop, we will drive east towards Johnston Ridge. We will stop and turn around at Johnston Ridge Observatory and see if we can catch a movie. This will be our **STOP 9**. For this stop, we don't have any questions. Simply enjoy the view, displays and movie. And use the bathroom.

Q19. Keep track of the mileage and the amount of time it takes for the bus to drive back to the edge of the blast (i.e. singe) zone. Based on your knowledge of the geology, and assuming driving the same road we will be driving, do you think you would have survived and made it to safety on the day of the eruption? Explain.

Relevant eruption facts:

Lateral blast—575-750 F (300-400 C) in blast zone, 120-390 F (50-200 C) in singe zone, moved an average of 450 mph (724 km/h).

Pyroclastic flows—mainly 570-1350 F (300-730 C), moved at 50-80 mph (80-130 km/h), traveled 5 miles (8 km).

Debris Avalanche—160-212 F (70-100 C), moved up to 180 mph (290 km/h), traveled 14 mi (22 km) west in the Toutle river valley.

Lahars—not hot, traveled up to 90 mph (145 km/h).