

## Field Trip Workbook

NAME: \_\_\_\_\_

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

Fall, 2018

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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, 5.1 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. *Students should stay on the safer south side of the highway where the pullout is located and where a better view is obtained.*

Q1. What type of rock makes up this outcrop? How were these rocks formed? What is the age of the rocks?

Q2. What structural features cross-cut the strata?

Q3 The strata here demonstrate three geologic principles. Name them. What do they imply about the geologic history of this location?

Q4. Draw a cross-section of the slope stabilization built on the south side of the road (opposite the road cut). 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. Information panels are best read from right to left.

Q5. This stop is at the edge of the “blast zone” (panel says 14.8 miles from crater). How has the vegetation recovered in the blast area (how tall are the trees)?

Q6. Hoffstadt Creek occurs at the geologic contact between two contrasting materials. What are these, and how did it complicate the building of the bridge?

**STOP 4- Forest Learning Center, Weyerhaeuser Overlook, between mileposts 33-34, Hwy 504.** Large parking area, bathrooms (next opportunity is STOP 8), gift shop. *This will be our LUNCH stop.*

Q7. Describe or draw a sketch of the deposits at the bottom of the Toutle river valley (there are three different ones). What is their origin? In which sequence did they form? 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. Label what these zones represent. *Students should stay on the safer south side of the highway, where a better view is obtained.*

**STOP 5- Road cut just past milepost 38, Hwy 504.**

Q9. What is the name of the prominent feature visible in the road cut and how did it form? Was this feature primarily produced by mechanical or chemical weathering? How can you tell? Use words and sketches.

Q10. What evidence is there at this stop for slope failure? What mitigation efforts have been performed, and have they been successful?

**STOP 6 (optional) Castle Lake Viewpoint, between milepost 40-41, Hwy 504.** Large parking area.

Q11. What type of deposit is in the Toutle river valley below Castle Lake, and how does it differ from that at Stop 4?

Q12. What is the relationship of the deposits in the Toutle river valley to Castle Lake?

Q13. Closer to the base of Mt. St. Helens, one can see the relatively flat Pumice Plain. What is the origin of this plain?

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

Q14. After walking the length of the outcrop, draw a sketch of the rock features exposed in the road cut on the north side of the highway. Your sketch should show different rock units and some structural features.

Q15. What evidence is there that lava filled a depression?

Q16. What evidence is there that lava was transported upward in a fracture?

**STOP 8- Mouth of Coldwater Lake, milepost 45, Hwy 504.** There are two parking areas to north of highway, with picnic tables and restrooms. Bus will go the west parking area, which after exiting involves a right followed by a left. *We will be walking about 100 m, onto a boardwalk that is constructed over the lake.*

Q17. Give a brief synopsis of the geological history of the area. Your narrative should include pre-blast, immediately after the blast, years after the blast, and current periods. Geological features that formed during these periods should be mentioned.

**STOP 9. Johnston Ridge Observatory Visitor Center, between mileposts 51-52.**

*At the Visitor Center we will need to get wristbands to enter. When inside, look at the displays and maybe catch a movie. Also make sure to use the bathroom.*

Q18. What did you find most interesting or noteworthy at the Visitor Center?

## RETURN TO PORTLAND.

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. See relevant eruption facts below.

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).

ON THE BUS RIDE BACK TO PORTLAND, DON'T FORGET TO TURN IN YOUR WORKBOOK TO THE T.A.