Mount St Helens National Volcanic Monument – Teacher's Corner 2011
Gifford Pinchot National Forest
USDA Forest Service

Reading the Landscape

Bus Activity

Time Requirement:	1 Hour
Roadway Used:	State Route 504
Locations:	Hoffstadt Bluffs to Johnston Ridge Observatory

This activity is to be completed en route to Coldwater and Johnston ridges. From the Hoffstadt Bluff Bridge to the Johnston Ridge Observatory students will use their observation skills, the teacher's directions, and information on their handout to identify geologic features along state route 504.

Goals:

1) The student will be able to identify key features of the 1980 and previous eruptions from a bus seat.

Objectives:

1) To increase student comprehension of the May 18, 1980 eruptive events before arriving to the visitor centers by orienting them to key eruptive features and their effects.
2) Students will distinguish one geologic feature from another.
3) Students will not throw up.

Reading the Landscape

Bus Activity

Directions:

Read the questions and observe the landscape to locate the geologic features listed below. You can also use the green milepost markers along State Route 504 to help find the following geologic features:

Blown Down Forest	Landslide-scoured Valley	Replanted Blast Zone
Castle Lake	Lava Dome	Shattered Stump Forest
Coldwater Lake	Lumpy Landslide Deposits	Smooth Pumice Plain
Gray Mudflow Flat	North Fork Toutle River	South Coldwater Creek

Step A - Look straight ahead as you cross a long straight bridge between ***mileposts 29 and 30*** to identify a key feature. This feature will remain visible on ***both sides*** of the road for several miles.

Feature 1: _____

Step B - Between ***mileposts 31 and 32*** look out the ***right side*** of the bus into the valley below. Identify two key features on the valley floor.

Feature 2: _____

Feature 3: _____

Step C - As you pass Elk Rock Viewpoint at ***milepost 37*** look out the ***right side*** of the bus into the valley below. Identify a feature on the valley floor below (#4), and a feature on the valley floor in front of Mount St. Helens (#5).

Feature 4: _____

Feature 5: _____

Step D - Between ***mileposts 40 and 41*** look ***straight ahead and out the right side*** of the bus. Identify a feature on the opposite side of the valley floor (#6), and a feature on the ridge sides as you look toward and past Coldwater Ridge Visitor Center (#7).

Feature 6 : _____

Feature 7: _____

Step E - As you pass the Hummocks Trail between ***mileposts 45 and 46*** look out the ***left side*** of the bus and identify a key aquatic feature on the valley floor.

Feature 8: _____

Step F - Between ***mileposts 46 and 47*** look out the ***right side*** of the bus, and identify another aquatic feature on the valley floor.

Feature 9: _____

Step G - As you round a hairpin turn between ***mileposts 49 and 50*** look out the ***right side*** of the bus and identify a key feature on the lower half of the valley walls.

Feature 10: _____

Step H - Between ***mileposts 50 and 51*** look out the ***left or right side*** of the bus and identify a key feature created when on May 18, 1980 an explosion burst out the side of Mount St. Helens.

Feature 11: _____

Step I - As you pass Loowit Viewpoint just before ***milepost 51*** look out the ***right side*** of the bus and identify feature in the distance.

Feature 12: _____

Teacher Answer Sheet to Reading the Landscape

Bus Activity

Directions:

Read the questions and observe the landscape to locate the geologic features listed below. You can also use the green milepost markers along State Route 504 to help find the following geologic features:

Blown Down Forest	Landslide-scoured Valley	Replanted Blast Zone
Castle Lake	Lava Dome	Shattered Stump Forest
Coldwater Lake	Lumpy Landslide Deposits	Smooth Pumice Plain
Gray Mudflow Flat	North Fork Toutle River	South Coldwater Creek

Step A - Look straight ahead as you cross a long straight bridge between ***mileposts 29 and 30*** to identify a key feature. This feature will remain visible on ***both sides*** of the road for several miles.

Feature 1: ***Reforested Blast Zone***

[Weyerhaeuser Timber Corporation owns 68,000 acres of the 150,000-acre blast area. They logged and replanted the areas on both sides of the road between Hoffstadt Bridge and Elk Rock Viewpoint. Between Elk Rock and Coldwater Ridge, Weyerhaeuser owns land on the north (uphill side) of the road, and a little bit of land on the south side (downhill side). Evergreen greens tree planted in rows differentiate Weyerhaeuser land from the National Volcanic Monument that was set aside to recover at natures own pace.]

Step B - Between ***mileposts 31 and 32*** look out the ***right side*** of the bus into the valley below. Identify two key features on the valley floor.

Feature 2: ***North Fork Toutle River***

Feature 3: ***Mudflow-filled Valley***

[The gray flood plain was created by a mudflow, a wet-concrete like flow of water, mud, rock and debris. This flow eventually entered the Columbia River, changing its depth from 39 feet to 13 feet.]

Step C - As you pass Elk Rock Viewpoint at ***milepost 37*** look out the ***right side*** of the bus into the valley below. Identify a feature on the valley floor below (#4), and a feature on the valley floor in front of Mount St. Helens (#5).

Feature 4: ***Landslide-filled Valley***

[On May 18, 1980, a gigantic landslide fell from the north face of Mount St. Helens. The landslide slammed against Johnston Ridge and was deflected down

the North Fork Toutle River valley. The lumpy mounds are actually large intact chunks of the volcano that were carried down valley in the landslide.]

Feature 5: ***Smooth Pumice Plain***

[Searing hot avalanches of hot gas, ash, pumice, and broken rock fragments tumbled out of the crater on May 18, 1980, forming a broad pumice plain in front of Mount St. Helens.]

Step D - Between ***mileposts 40 and 41*** look ***straight ahead and out the right side*** of the bus. Identify a feature on the opposite side of the valley floor (#6), and a feature on the ridge sides as you look toward and past Coldwater Ridge Visitor Center (#7).

Feature 6 : ***Castle Lake***

[This lake was formed after the eruption. The landslide blocked the outlet drainage to Castle marsh, causing water to pool up behind the landslide deposit.]

Feature 7: ***Blown Down Forest***

[The blown down trees inside this section of the National Volcanic Monument are hard to see. Most of this area was privately owned before the eruption and had been logged prior to the eruption—flat cut stumps reveal pre-eruption clear cuts. The blown down trees tend to be small, because they were young when blown down during the eruption.]

Step E - As you pass the Hummocks Trail between ***mileposts 45 and 46*** look out the ***left side*** of the bus and identify a key aquatic feature on the valley floor.

Feature 8: ***Coldwater Lake***

[This lake also formed after the eruption. The landslide blocked the outlet Coldwater Creek causing water to pool up behind the 230-foot deep landslide deposit and eventually creating Coldwater Lake.]

Step F - Between ***mileposts 46 and 47*** look out the ***right side*** of the bus, and identify another aquatic feature on the valley floor.

Feature 9: ***South Coldwater Creek***_____

Step G - As you round a hairpin turn between ***mileposts 49 and 50*** look out the ***right side*** of the bus and identify a key feature on the lower half of the valley walls.

Feature 10: ***Landslide-scoured Valley***_____
[The landslide ramped up and over two sections of Johnston Ridge (look for lumpy landslide deposits on the top of Johnston Ridge as you approach the hairpin turn). The landslide scraped away the soil exposing bedrock as it flowed down the South Coldwater Creek Drainage. The ground is tan-light brown where the landslide scoured away the soil and there are ***no*** *blown down trees. You will be able to see the areas not scoured above them. Above the scour lines the ground is gray and there are stumps and blown down trees.* _____

Step H - Between ***mileposts 50 and 51*** look out the ***left or right*** side of the bus and identify a key feature created by the lateral blast.

Feature 11: ***Shattered Stump Forest***_____
*[The lateral blast traveled at an average speed of 450 mph. At Johnston Ridge the blast shattered the trees and carried them away. Geologists believe that the blast cloud doubled in volume the first five miles it traveled by consuming the forest that was in its pathway].*_____

Step I - As you pass Loowit Viewpoint just before ***milepost 51*** look out the ***right side*** of the bus and identify feature in the distance.

Feature 12: ***Lava Dome***_____
[The dome on the center of the crater floor was constructed by 17 separate eruptions of thick pasty lava. The dome is about 3000-feet wide and 920-feet high.]

Instructional Sequence for Reading the Landscape:

1. Have your students place their "Reading the Landscape" worksheets on top of their clipboards by the time your bus passes milepost 27. This will allow you about three minutes to explain the lesson plan before you reach the first feature to be identified.

2. As your bus approaches milepost 28 point to the milepost marker so students can become familiar with their appearance. If students sitting on the left side of the bus cannot see the milepost markers explain that you will announce when the bus is approaching/passing a milepost marker, or you can assign the task to a student.

3. Explain that their purpose is to find the geologic features listed in the table on the "Reading the Landscape" worksheet. Then explain that you or the designated student will alert students as they approach/pass milepost markers associated with each question. They will be identifying features between mileposts 29 and 51.

4. Encourage students to:

    A. **Read the questions before they reach the milepost markers in order to know where to look.** Some features are only visible for short periods of time!

    B. Read roadside signs to help identify geologic features on their worksheet. Some signs provide big clues! i.e. there are two lakes they have to identify. One is identified with a sign, but the other is not.

    C. Write with pencils, so they can erase incorrect answers. Students may be able to identify some features through a process of elimination

    NOTE: If you stop at the Coldwater Ridge Visitor Center or Coldwater Lake Recreation before driving to Johnston Ridge, don't forget to complete the activity. Several of the geologic features students will need to identify are located between the Coldwater Ridge and Johnston Ridge Centers.

5. After departing Johnston Ridge Observatory, consider reviewing the answers en route. After learning about the eruption students should be able to clearly identify the geologic features in question.