



Ethical Equilibrium Outdoor Activity

Time Requirement: 15 to 30-minutes
Trail Used: Castle Lake Viewpoint Trail
Location: Castle Lake Viewpoint

The purpose of this activity is to demonstrate the challenges associated in land use planning when multiple private, state, and federal agencies are involved. Controversy can erupt when agencies with different missions try to find consensus. Environmental issues often breed strong opinions that are rooted in personal and scientific beliefs. Sharp criticism and intense opinions by interest groups can leave federal land managers in difficult situations. When faced with meeting the agency mission and balancing the desires of the public, federal land managers must make critical decisions that can alienate some groups, or make compromises that may not fully please everyone.

Goal: To work in small groups to find solutions to complex problems faced by the manager of Mount St. Helens National Volcanic Monument.

Objectives:

- 1) The student will use the scientific process to deduce a reasonable explanation.
- 2) The student will apply knowledge acquired during the activity.
- 3) The student will compare, contrast and sort observations.
- 4) The student will reach a conclusion and be able to support it with evidence in writing.

Washington Essential Academic Learning Requirements

3.2.4 Environmental and Resource Issues

Analyze how human societies’ use of natural resources affects the quality of life and health of ecosystems

- Explain the effects that the conservation of natural resources has on the quality of life and health of ecosystems.
- Explain the effects various human activities on the health of an ecosystem and/or the ability of organisms to survive in that ecosystem.

2.2.5 Evolution of Scientific Ideas

Understand that increased comprehension of systems leads to new inquiry.

- Describe how results of scientific inquiry may change our understanding of the systems of the natural and constructed world.

2.2.2 Limitations of Science and Technology

Understand that scientific theories explain facts using inferential logic

- Describe how new facts or evidence may result in the modification or rejection of a theory.

1.2.1 Structure of Physical Earth/Space and Living Systems

Analyze how the parts of the system interconnect and influence each other

- Explain how the parts of the system interconnect and influence each other
- Describe the interactions and influences between two or more simple systems.

1.3.3 Conservation of Matter and Energy

Understand that matter is conserved during physical and chemical change.

- Observe and describe that substances undergoing physical changes produce matter with the same chemical properties as the original substance and the same total mass.

1.3.4 Processes and Interactions in the Earth's system

Understand the processes that continually change the surface of the Earth.

- Describe how destructive processes change landforms.

1.3.9 Biologic Evolution

Understand how the theory of biological evolution accounts for species diversity, adaptation, natural selection, extinction, and change in species over time.

- Describe how individual organisms with certain traits are more likely to survive and have off-spring.

1.3.10 Interdependence of Life

Understand how organisms in ecosystems interact and respond to their environment and other organisms.

- Describe how a population of an organism responds to change in its environment.

Ethical Equilibrium

Outdoor Activity

Monument Mission:

Mount St. Helens National Volcanic Monument was established to allow natural processes to occur without human intervention. The mission is to provide research, recreation and educational opportunities for the public.

Directions:

Land managers have to make hard decisions that balance their mission with the desires of the public. Use the 'case facts' for each stop and evidence at the site to answer the questions. Start at the interpretive sign facing Mount St. Helens.

State Route (SR) 504 Facts:

<ul style="list-style-type: none">• Before the 1980 eruption, SR 504 went through the valley bottom and accessed Spirit Lake. 22 miles of the highway were destroyed during the May 18, 1980 eruption.
<ul style="list-style-type: none">• SR 504 was rebuilt at a cost to taxpayers of 180 million dollars. It was built high above the valley floor to protect eruptive features and because of the extensive erosion in the valley.

1) Do you think the highway was reconstructed in the right location or should it have been built in the valley bottom?

New Road Proposal Facts:

<ul style="list-style-type: none">• The Monument needs a budget of 4 million dollars, but has only 1.2 million dollars. The visitor center nearby closed partly because of a lack of funding.
<ul style="list-style-type: none">• Visitation to one county in the Monument has significantly increased since SR 504 was re-built.
<ul style="list-style-type: none">• Visitation in two counties was high before SR 504 was re-built, but declined 50% since it opened.
<ul style="list-style-type: none">• Commissioners from all three counties want to increase tourism by building a road across the valley in front of the volcano to provide summer access to the counties where visitation declined.
<ul style="list-style-type: none">• The proposed road location lies in a flood plain and research area where major scientific discoveries have been made. The road would be seasonal, only open 6 months/year.

1) List what you think are the positives and negatives of the new road proposal

Positives	Negatives

- a) Rank your top three positive and negative outcomes by placing a 1, 2, and 3 beside it.
- b) Based on your list of positives and negatives, explain why you think the road should or should not be built.

Stop # 2: Go to the interpretive sign facing Castle Lake.

Sediment Facts	North Fork of Toutle River
May 18, 1980 Eruption	<ul style="list-style-type: none"> Landslide buried 14 miles of river under 150-250 feet of rock. Mudflow deposited ___ million cubic yards of sediment and rock
Erosion	<ul style="list-style-type: none"> River reforms, canyon forms, unstable river channel shifts back & forth. Sediment creates flooding hazards to downstream communities & blocks ocean-bound ships in the Columbia River. 10% of landslide eroded. Sediment load 10 times higher than before eruption.
Sediment Retention Structure (SRS)	<ul style="list-style-type: none"> Located outside of Monument 250 million cubic yards of sediment trapped, cleaner water flows around it in a spillway.

2) The \$65 million dollar SRS opened in 1989. It was supposed to collect sediment until the year 2035, but was almost full by 2008. Circle what you think is the best option to resolving this problem.

- a. Make the SRS taller so that it can continue to trap sediment.
- b. Do nothing. The SRS should continue to trap some sediment.
- c. Remove the SRS so the river can run wild.

a) Explain why you chose this solution to the problem?

Salmon Facts	North Fork of Toutle River	South Fork of Toutle River
Pre-eruption Fish	<ul style="list-style-type: none"> • Coho Salmon & Steelhead Trout 	<ul style="list-style-type: none"> • Coho Salmon & Steelhead Trout
Erosion	<ul style="list-style-type: none"> • Unstable river channel shifts back & forth. • 10% of landslide eroded. • Sediment load 10 times higher than before eruption. 	<ul style="list-style-type: none"> • Mudflow deposits eroded quickly • River channel stabilized & water clears. • Trees grow along channel. Shade lowers water temperatures.
Salmon Status	<ul style="list-style-type: none"> • No fish ladder around SRS. • Fish are collected, transported & released in streams above SRS. • A few fish have spawned in the streams above the SRS. • Salmon habitat is poor above SRS Water is murky & warm. 	<ul style="list-style-type: none"> • No SRS • Salmon recovery well underway. • Salmon habitat is good. Stable channel with exposed cobbles for spawning. Shade from trees lower water temperatures.

b) The fish collection station is closed several days a week to remove debris. A small barrier in the SRS spillway prevents fish from moving up river naturally. Should funds be invested to remove this barrier?

Conclusion:

Circle your answer:

1. I think funds should be invested to raise the SRS and to remove the salmon barrier so fish can swim up stream naturally.
2. I do not think funds should be invested to raise the SRS or to remove the barrier to salmon.
3. I have reached a different conclusion that I will explain below...

Stop # 3: Go to the interpretive sign facing Elk Rock.

Management Facts:	Federal	State	Weyerhaeuser
Acres Impacted Lateral Blast	<ul style="list-style-type: none"> • 71,000 	<ul style="list-style-type: none"> • 11,000 	<ul style="list-style-type: none"> • 68,000
Acres logged	<ul style="list-style-type: none"> • 22,000 Gifford Pinchot National Forest 	<ul style="list-style-type: none"> • 11,000 • Land on opposite side of valley 	<ul style="list-style-type: none"> • 68,000 * • Land above highway • *Some land sold to create Monument
Acres Preserved	<ul style="list-style-type: none"> • 49,000 blast zone included in 110,000 acre Monument 	<ul style="list-style-type: none"> • 0 	<ul style="list-style-type: none"> • 0

3) Some visitors feel leaving the blown down forest was a tremendous waste—the trees should have been harvested for human use. Other visitors feel it is a spectacular feature and that not enough was preserved. What do you think?

Reforestation Facts:	Federal	State	Weyerhaeuser
Acres Replanted	<ul style="list-style-type: none"> • 22,000 Gifford Pinchot National Forest • 49,000 preserved in Monument 	<ul style="list-style-type: none"> • 11,000 • Land on opposite side of valley 	<ul style="list-style-type: none"> • 68,000 * • Land above highway • *Some land sold to create Monument
Mission	<ul style="list-style-type: none"> • Monument: allow natural processes to occur. Research, recreation, education 	<ul style="list-style-type: none"> • Multiple Use • Recreation, wildlife, watershed, fire, harvesting & replanting forests 	<ul style="list-style-type: none"> • To grow & harvest trees to produce paper & wood products.
Biologic Diversity	<ul style="list-style-type: none"> • 5 eruptive events, 5 unique ecosystems • Ground-breaking geologic & biologic lessons research 	<ul style="list-style-type: none"> • Less diverse. • Primarily two tree species planted 	<ul style="list-style-type: none"> • Less diverse. • Primarily two tree species planted

a) When some visitors see greener replanted areas they wonder why trees weren't planted in the Monument. Explain why trees should or shouldn't have been planted in the Monument?

Recreation Facts:	Monument	State	Weyerhaeuser
<p style="text-align: center;">Mission</p>	<ul style="list-style-type: none"> • Preserve 1980 eruptive features & allow natural processes to occur. • Research, recreation, education • Ground-breaking geologic & biologic lessons research • 750,000 recreation visits/year • 130,000 attend educational programs. 	<ul style="list-style-type: none"> • Multiple Use • Recreation, wildlife, watershed, fire, harvesting & replanting forests 	<ul style="list-style-type: none"> • To grow & harvest trees to produce paper & wood products.
<p style="text-align: center;">Recreation Use</p>	<ul style="list-style-type: none"> • 230 miles hiking trails No off-trail travel • Backcountry camping • No campgrounds • Fishing, except in Spirit Lake • Limited hunting, some areas closed • Horseback trails on green forest trails. 	<ul style="list-style-type: none"> • Hunting, fishing, & motorized use. • No trails. 	<ul style="list-style-type: none"> • Hunting & Fishing • No trails. • No motorized use due to vandalism, dumping & theft

b) People in local communities feel that Monument regulations are too restrictive and want them changed. They want lodges, cabins and campgrounds to be re-built. They also want areas re-opened to hunting, fishing, horseback, motorcycle and snowmobile riding. If you were the Monument Manager, what would you do?

Conclusion:

Circle your answer:

1. I think the purpose of the Monument balances preservation, research and the desires of the public.
2. I think the purpose of the Monument does not balance preservation, research and the desires of the public.
3. I have reached a different conclusion that I will explain below...

Instructional Sequence for 'Ethical Equilibrium'

Before Exiting the Bus:

- 1) This activity can be conducted in several ways depending on your time constraints and the size of your group. Divide your students into three groups and designate a student leader(s) for each group.

If time is limited, explain that each group will be stationed beside one of the three interpretive signs along the 150 foot long loop trail. Assign one of the three topics to each group and explain that they will be examining real issues faced by the Monument Manager. The students will have 15 minutes to review, debate, and formulate solutions to their issue. Return to the trailhead or bus and have each student leader(s) present their issue and solutions to the entire class.

If time is not limited, rotate the students between all three stations and have the groups review and debate each of the three issues.

- 2) Explain that the students will need to examine each issue from different perspectives, and that the "case facts" for each issue will provide information critical to finding solutions to the problems. Emphasize that these are complex issues that may produce strong reactions.
- 3) Make sure that students are dressed appropriately for the weather conditions before they exit the bus. Explain that each student will need a pencil, a clipboard or notebook to write on, and a copy of the 'Ethical Equilibrium' worksheet. Inform each student that walking off trail is strictly prohibited (\$100 fine).

Note: If the weather is truly horrendous conduct this activity on the bus.

On the Trail:

- 1) Have group #1 stop at the first interpretive sign/viewing area (facing the volcano) on the left side of the trail. Inform the group that they will review, debate and find solutions to a proposal to build a road across the valley in front of the volcano. Read aloud the 'State Route 504 Facts' then read aloud the questions. Ask for opinions and encourage debate.
- 2) Continue down trail and have group #2 stop at the second interpretive sign facing Castle Lake. Inform the group that they will review, debate, and find solutions to what to do about erosion at Mount St. Helens. Read aloud the 'Sediment and Salmon Facts' then read aloud the questions. Ask for opinions and encourage debate.
- 3) Continue down trail and have group #3 stop at the third interpretive sign facing Elk Rock. Inform the group that they will review, debate, and find solutions to issues related to the land use planning. Read aloud the 'Land Use Planning Facts' then read aloud the questions. Ask for opinions and encourage debate.
- 4) Walk back and forth between groups to make sure each group is on task. Encourage different perspectives and group participation. After 15 to 20 minutes, rotate the groups between stations or return them to the bus and have the group leaders present their groups opinion on the issue.