



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

## **Survivor Johnston Ridge** **Outdoor Activity**

**Time Commitment:** 45 minutes to 1 hour.  
**Site:** Johnston Ridge Observatory  
**Location:** The Eruption Trail

The purpose of this activity is to familiarize students with characteristics of the May 18, 1980 lateral blast, and factors that led to the survival and colonization of plants and animals. This challenging activity will test your students’ observational skills and deductive capabilities as they examine geological and biological features along the trail. Students will become familiarized with abiotic (i.e. sunlight, water, wind, degree of slope) and biotic factors that influenced plant and animal survival and colonization on Johnston Ridge. This outdoor activity can be conducted on days with good or poor visibility, because it is focused on features immediately adjacent to the trail. Students will be better served if they watch the movie and review the exhibits in the Johnston Ridge Observatory before conducting this activity.

### **Goal:**

- 1) The student will understand the factors that affect the biologic recovery on Johnston Ridge.

### **Objectives:**

- 1) The student will use the scientific process to deduce a reasonable explanation.
- 2) The student will compare, contrast and sort observations.
- 3) The student will reach a conclusion and be able to support it with evidence in writing.
- 4) Students will abide by all monument regulations while on the trail.

## **Washington Essential Academic Learning Requirements**

### **1.1.6 Characteristics of Living Matter**

Understand how to distinguish living from non-living and how to use characteristics to sort common organisms into plant and animals groups.

- Describe the characteristics of organisms.
- Classify and sort common organisms into plant and animal groups.

### **1.2.1 Structure of Physical Earth/Space and Living Systems**

Analyze how the parts of a system go together and how these parts depend on each other.

- Predict and explain how a system would work if one of its parts was missing or broken.

#### 1.2.4 Components and Patterns of Earth Systems

Understand the Earth's systems include a mostly solid interior, landforms, bodies of water, and an atmosphere.

- Identify and describe various landmasses, bodies of water, and landforms.

#### 1.3.1 Nature of Force

Understand forces in terms of strength and direction.

- Compare the strength of one force to the strength of another force.

#### 1.3.4 Processes and Interactions in the Earth's system

Know processes that change the surface of the Earth.

- Describe how earthquakes, landslides, and volcanic eruptions change the surface of the Earth.

#### 1.3.9 Biologic Evolution

Understand that plant and animal species change over time.

- Recognize and tell how some kinds of plants and animals survive well, some survive less well, and some cannot survive at all in particular environments, and provide examples.
- Recognize and describe how individual plant and animals of the same kind differ in characteristics and sometimes the differences give individuals an advantage in surviving and reproducing.

#### 1.3.10 Interdependence of Life

Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.

- Describe characteristics of organisms that allow them to survive in an ecosystem.
- Describe how an organism's ability to survive is affected by change in an ecosystem.

#### 2.1.3 Limitations of Science and Technology

Understand how to construct a reasonable explanation using evidence.

- Generate a scientific conclusion including supporting data from an investigation.
- Describe a reason for a given conclusion using evidence from an investigation.  
Generate a scientific explanation of observed phenomena using given data.

#### 2.2.5 Evolution of Scientific Ideas

Understand that scientific comprehension of systems increases through inquiry.

- Describe how scientific inquiry results in facts, unexpected findings, ideas, evidence, and explanations.

# Survivor Johnston Ridge

Outdoor Activity

## Mission:

Use the 'case facts' and evidence along the trail to answer the questions.

Use your answers to determine which explanation is best.

## Possible Explanations:

1. The characteristics of some plants and animals gave them an advantage in surviving and reproducing.
2. The characteristics of some plants and animals did not give them an advantage in surviving and reproducing.

## Case Facts:

- A. On May 18, 1980 the north side of the volcano collapsed and caused an explosion to burst out sideways at a speed of at least 300mph.
- B. Deep patches of protective snow covered some hillsides that face north.
- C. Spring arrives late in spring at high elevation sites, many plants do not sprout until mid-June. Roots and bulbs of plants are protected underground.
- D. The size, habitat, and lifestyles of plants and animals determined if they survived.

## Stop where you can see large rocks, stumps, and logs along the trail.

- 1) Find a stump or log. Describe what's missing from the tree and where you think it went?

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**Stop at the circular plaza on the left side of the trail. Use the sundial-like locator map to help you answer the questions.**

2) Mount St. Helens is due south. What direction are you facing? \_\_\_\_\_

What direction does this side of Johnston Ridge face? \_\_\_\_\_

Face Mount St. Helens, if a lateral blast burst out of the volcano what side of your body would be hurt the most, your front or back? \_\_\_\_\_

a) If a plant or animal could survive the eruption, which side of Johnston Ridge would it be more likely to survive on, the side facing the volcano or the opposite side? \_\_\_\_\_

b) Invent a plant or animal that could have survived on this side of the ridge.  
Draw it here.

b) Name your invented plant or animal \_\_\_\_\_

c) Describe things about your invented plant or animal that would have enabled it to survive the eruption. \_\_\_\_\_

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d) Are there few, some, or many plants growing on this side of Johnston Ridge? \_\_\_\_\_

**Turn left as you leave this plaza. Walk down hill and stop before you reach the stone memorial on the right side of the trail.**

3) Compared to the south side of Johnston Ridge is there more or less plant life growing on this opposite side of the ridge? \_\_\_\_\_

a) Plants didn't survive on the opposite side of Johnston Ridge. Could they have survived on this side? \_\_\_\_\_

b) How could a plant have survived on this side of the ridge?

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c) Which animals listed in the table could have survived the eruption here?

<b>Animal</b>	<b>Traits</b>	<b>Survivor? Yes or No</b>	<b>How did it survive?</b>
North American Elk	A large animal that feeds on grasses and small plants.		
Red-tailed Hawk	A bird that soars in the air when hunting for small mammals.		
Northern Pocket Gopher	Lives in underground tunnels. Feeds on roots and bulbs of plants		
Wolf Spider	Hunts for insects on plants, among rocks and in rotted logs.		

d) Some plants and animals returned after the eruption. Complete the chart below by listing the method of travel to Johnston Ridge.

<b>Plant or Animal</b>	<b>Travel Method(s)?</b> swim, walk, fly, hitch hike or drift
Huckleberry (seeds are inside berries)	
Grasses	
Golden-mantled Ground Squirrel	
Western Toad	
Raven	
Fireweed (pink flowers, light fluffy seeds)	

**Conclusion:**

Circle the best explanation.

1. The characteristics of some plants and animals gave them an advantage in surviving and reproducing.
2. The characteristics of some plants and animals did not give them an advantage in surviving and reproducing.

In complete sentences, explain the evidence you used to support your conclusion or reach a different conclusion.

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# Answer Sheet for Survivor Johnston Ridge

Outdoor Activity

## Mission:

Use the 'case facts' and evidence along the trail to answer the questions. Use your answers to determine which explanation is best.

## Possible Explanations:

1. The characteristics of some plants and animals gave them an advantage in surviving and reproducing.
2. The characteristics of some plants and animals did not give them an advantage in surviving and reproducing.

## Case Facts:

- A. On May 18, 1980 the north side of the volcano collapsed and caused an explosion to burst out sideways at a speed of at least 300mph.
- B. Deep patches of protective snow covered some hillsides that face north.
- C. Spring arrives late in spring at high elevation sites, many plants do not sprout until mid-June. Roots and bulbs of plants are protected underground.
- D. The size, habitat, and lifestyles of plants and animals determined if they survived.

## Stop where you can see large rocks, stumps, and logs along the trail.

- 1) Find a stump or log. Describe what's missing from the tree and where you think it went?

The lateral blast stripped needles, branches and bark from the trees, and shattered the trunks into tiny pieces. Needles, branches, bark, and pieces of wood from the tree trunks are not visible here so they must have been carried away by the blast.

**Stop at the circular plaza on the left side of the trail. Use the sundial-like locator map to help you answer the questions.**

2) Face Mount St. Helens, what direction are you facing? South

Face Mount St. Helens, what direction does this side of Johnston Ridge face? South

Face Mount St. Helens, if a lateral blast burst out of the volcano what side of your body would be hurt the most, your front or back? Front

a) If a plant or animal could survive the eruption, which side of Johnston Ridge would it be more likely to survive on, the side facing the volcano or the opposite side? The opposite side, it provided some protection

b) Invent a plant or animal that could have survived on this side of the ridge.  
Draw it here.

c) Name your invented plant or animal \_\_\_\_\_

d) Describe things about your invented plant or animal that would have enabled it to survive the eruption.

Protective aspects are key to this answer—the ability to hide underground, under snow, underwater, or to have a hard exterior. The ability to breathe is important due to hot temperatures and heavy ash fall. If an animal was chosen the ability to feed after the eruption is important. Some small mammals survived the eruption, but died shortly afterward due to a lack of food and/or shelter.

d) Are there few, some, or many plants growing on this side of Johnston Ridge? There are few plants on this side of the ridge.



**Turn left as you leave this plaza. Walk down hill and stop before you reach the stone memorial on the right side of the trail.**

3) Compared to the south side of Johnston Ridge is there more or less plant life growing on this opposite side of the ridge? More

a) Plants didn't survive on the opposite side of Johnston Ridge. Could they have survived on this side?

Yes, this side of the ridge offered some protection from the blast.

b) How could a plant have survived on this side of the ridge?

Deep snow packs that had accumulated on the north-facing slopes protected some small plants from the scouring and intense heat of the blast. Stumps and rocks may have also offered some protection. The root systems of some plant species survived and were able to re-sprout.

c) Which animals listed in the table could have survived the eruption here?

<b>Animal</b>	<b>Traits</b>	<b>Survivor? Yes or No</b>	<b>How did it survive?</b>
North American Elk	A large animal that feeds on grasses and small plants.	NO	
Red-tailed Hawk	A bird that soars in the air when hunting for small mammals.	NO	
Northern Pocket Gopher	Lives in underground tunnels. Feeds on roots and bulbs of plants	YES	Underground
Wolf Spider	Hunts for insects on plants, among rocks and in rotted logs.	YES	Inside logs

d) Some plants and animals returned after the eruption. Complete the chart below by listing the method of travel to Johnston Ridge.

<b>Plant or Animal</b>	<b>Travel Method(s)?</b> swim, walk, fly, hitch hike or drift
Huckleberry (seeds are inside berries)	<i>Hitch hike</i>
Grasses	<i>Drift</i>
Golden-mantled Ground Squirrel	<i>Walk</i>
Western Toad	<i>Walk</i>
Raven	<i>Fly</i>
Fireweed (pink flowers, light fluffy seeds)	<i>Drift</i>

### **Conclusion:**

Circle the best explanation.

- ①. The characteristics of some plants and animals gave them an advantage in surviving and reproducing.
2. The characteristics of some plants and animals did not give them an advantage in surviving and reproducing.

In complete sentences, explain the evidence you used to support your conclusion or reach a different conclusion.

*Size and protection were critical to survival. Large trees and plants were shredded apart by the ferocious blast, but the characteristics of small plants and shrubs enabled some of them to survive. Plants that can re-sprout from intact root systems or species that tolerate being buried beneath deep snow packs were able to survive. Large mammals and birds live exposed lifestyles and died—there was little to no protection from the blast. Small mammals were able to survive underground, inside logs, or under snow.*

## Instructional Sequence for “Survivor Johnston Ridge”

1. Send a chaperone up the eruption trail ahead of the group and have the adult stop at the first interpretive sign on the right side of the trail. Make sure the adult is standing next to the sign and is clearly visible to the students at the trailhead. The adult’s role will be to orient students to a maximum distance to travel before stopping.
2. Gather students at the trailhead, located on the outdoor viewing plaza at the Johnston Ridge Observatory. Divide students into groups of five and assign one chaperone to assist each student group. Explain that the students will need a pencil, “*The Case of the Big Blast*” worksheet and clipboard or notebook to write on.
  - a) Explain that the area around them was forested prior to the May 18, 1980 eruption, and that this ridge was scoured and buried by the lateral blast.
  - b) Explain the importance of staying on trail at all times. It has taken over 28 years for plant life to get a foothold on this ridge. **Hiking in this area is a privilege and that student behavior will determine if future groups will be able to use this site.** Students will be examining rocks and shattered tree stumps, but they are **not to get off the paved trail or collect, ash, rocks, wood or plants.**
2. Point to the chaperone standing next to the interpretive sign (see picture below) and explain that the students are not to proceed beyond that point. Explain that the students will need to spread out along this stretch of the trail. They will need to stop near a stump or log. Inform the students that the ‘case facts’ will be critical to answering these questions 1a-d.



- a) While the students are answering these questions send another adult to the top of the hill and have them stop at the intersection to the viewing plaza with sundial-like map locator.
- b) Move between groups, and assist where needed. Inform the students to stop at the circular viewing plaza where the adult will be waiting.

3. Allow the students 15 to 20-minutes to make observations and use the directional finder in the circular plaza to answer questions 2a-d. North-south orientation is critical to this stop and to the biological stories on this ridge.

View south of volcano  
from circular plaza



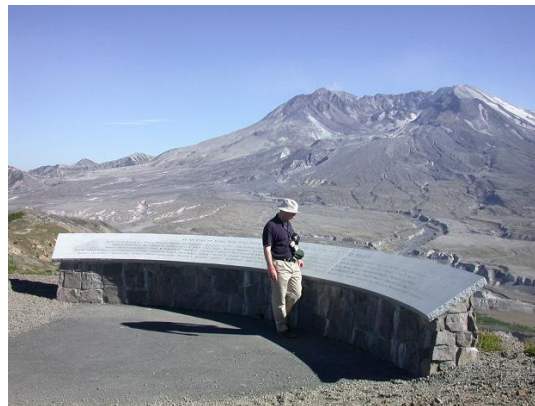
View of vegetation on  
south-facing slope



View of vegetation on  
north-facing slopes



- a) While the students are answering these questions send another adult to the top of the hill and have them stop 75 to 100 feet before the memorial to the people who died during the May 18, 1980 eruption. Explain that they should stop where there is lots of vegetation.
4. Turn left as they leave the plaza. Stop 75 to 100 feet before the memorial to those who died during the eruption. Explain that the student groups will need to spread out along this stretch of the trail. They will need to stop where there is a lot of plant life. The 'case facts' will be critical to answering questions 3a-d.



- a) Allow the students 15 to 20-minutes to make observations, answer the questions, and to answer the concluding question. Move between groups and assist where needed.
- b) Gather students by the memorial and review answers to the concluding question
- c) Continue on the eruption trail to the parking lot. Use your chaperones to safely direct students across the parking lot to the busses.