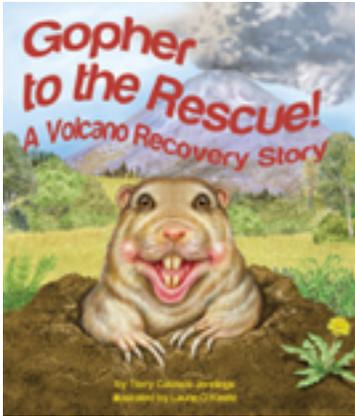


# Changes! Changes! Changes!

## What Changes When a Volcano Erupts?

### Activity Based on

## Gopher to the Rescue! A Volcano Recovery Story



The animals on the mountain are surprised to feel the ground shake beneath their paws. Steam and ash rise from the mountain top. A volcano is erupting!

*Gopher to the Rescue! A Volcano Recovery Story*, is based on the recovery after the eruption of Mount St. Helens on May 18, 1980. It chronicles how life returns to the devastated mountain and the surprising role tiny gophers played on the mountain's recovery.

Based on the research of scientists at Mount St. Helens, the book describes how the gophers' tunnels provided islands of soft, fertile soil where seeds could take hold and thrive. It follows animals that survived and animals in the neighboring, undamaged forests as they first visit and then begin to stay and live on the mountain when the conditions are right. It describes the recovery of the ecosystem as the mountain changes, and different plants and animals are able to find food, shade, shelter, and nesting areas—the conditions they need to live.

## Introduction

*Changes! Changes! Changes!* can be a class discussion, or a collaborative exercise. We hope in the near future to also have this as an interactive game. Using the worksheet at the end of this document, have your students work in groups to decide whether a volcanic eruption caused a change or whether perhaps it caused no difference. They can also discuss whether the changes were long lasting or short term. Once the groups are finished, a group can volunteer to start the discussion on a topic. Other groups can add or dissent. You can round out the discussion with the information provided here and with a PDF of a powerpoint provided on [http://www.terrycjennings.com/Changes\\_on\\_the\\_Mountain.pdf](http://www.terrycjennings.com/Changes_on_the_Mountain.pdf). This activity is based on the May, 1980 eruption of Mount St. Helens Volcano. To see the core standards to which *Gopher* is aligned, please visit: [http://www.sylvandellpublishing.com/Standards\\_by\\_title.php?state=CR&t=114](http://www.sylvandellpublishing.com/Standards_by_title.php?state=CR&t=114). For images for this activity visit [http://www.terrycjennings.com/Changes\\_on\\_the\\_Mountain\\_Slides.pdf](http://www.terrycjennings.com/Changes_on_the_Mountain_Slides.pdf)

## Pre-Reading Discussion

Ask students to share what they know about volcanic eruptions and how they think the mountain will change. Discuss the difference between long lasting and short term.

When a volcano erupts, the mountain changes dramatically in a very short period. Some of the changes last a few days, or months, or years. Some of the changes will last a long, long time. We cannot say that any changes are permanent, especially on a volcano. The next eruption will bring changes, of course, but even if there are no further eruptions, natural processes will continue changing the mountain. All we can say is that the mountain will never be the same as it was before the eruption and that the mountain will continue to change.

This activity looks at what took place at Mount St. Helens as a result of the eruption of 1980. Think about the items listed on the work sheet. Did they change or did they remain the same? Then consider whether the changes were long lasting or short term. You'll find out how the mountain changed, because of the eruption. And as you answer the questions, you'll see how the mountain recovers.

## AIR

### Change:

Air changed during the eruption. Gases erupted out of the crater—water vapor (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>)—these gas molecules joined the molecules of oxygen, nitrogen, argon, carbon dioxide and other trace gases normally found in our atmosphere. Ash also filled the air and choked the animals that breathed it. The ash-filled air darkened the sun in towns near Mount St. Helens and the street lights came on. In these towns, people stayed inside for a few days and they wore masks when they went outside. Ash was found around the world within two weeks after the eruption. (SLIDE 3)



Fortunately, these changes were very short-term. The gases dissipated very quickly in the atmosphere and the ash settled out of the air to the ground. A long lasting change, however, was that animals which breathed the ash died because the ash filled and hardened their lungs. Eventually, (after a long period) all the species returned to the mountain.

## WATER

### Change:

There were lakes, ponds, rivers and creeks, on and around the mountain before the eruption and there were lakes, ponds, rivers and creeks on and around the mountain after the eruption. But they had changed! The debris avalanche spilled into Spirit Lake (SLIDE 4) and raised its level by 210 feet. On the other hand, the eruption dammed Coldwater Creek to make Coldwater Lake (SLIDE 5). Some creeks changed course. Some ponds emptied but others were formed. One big change in water was that most fish in lakes and rivers were killed. The debris avalanche and mudflows clogged up streams and buried some fish. Water heated to more than 86°F killed others. One “no change” about water was the salamander and toad pollywogs which lived in lakes and ponds covered by ice. They survived.



We can say the changes to the ponds, lakes and rivers are long lasting. Of course, they will continue to change, but not because of this particular eruption. The loss of fish, was temporary. Fish began to swim back and populate the rivers very quickly.

## WEATHER

The eruption didn't affect the weather. Temperatures were very warm right during the eruption, but they quickly cooled. Rain and wind were not affected.

## SHAPE OF THE MOUNTAIN

Change:  
Of course the shape of the mountain changed. **Before** the eruption, Mount St. Helens was cone shaped. **After** the eruption a huge bite had been taken off its top. Mount St. Helens did not spew out lava. In some volcanic eruptions that involve a lot of lava, the flow hardens on the sides and changes the shape of the mountain. (SLIDE 6)



The eruption of Mount St. Helens created a crater 2000 ft deep and about 2 miles wide. In June and August some lava erupted forming domes on the crater. These domes didn't last. They were destroyed by explosive eruptions. From October, 1980 through 1986, a dome began to grow without interruption. It grew again from 2004-2008.

The bite the eruption took off the mountain's summit is long lasting. The top of the mountain will change as a result of other eruptions, the growth of a dome and volcanic or tectonic activity. (SLIDE 7)

## HEIGHT OF THE MOUNTAIN

Change:  
You knew that Mount St. Helens lost height, but did you know how much? Mount St. Helens **lost 1300 feet** (SLIDE 8) from the eruption.

This is just like the shape of the mountain. It will be permanent until another eruption changes it, or a dome building event, or uplift from tectonic activity raises it.



## ANIMALS

Change:



Sadly, thousands of animals were killed by the eruption. They died from the force of the blast, being run over or buried in the avalanche, and from breathing ash-filled air. (SLIDE 9)

After the eruption most animals were gone from the mountain. They were unable to return to live on the mountain until they had food, shelter and places to nest. In some instances, this took days, but in most instances it took years.

Animals were able to return to visit the mountain and to live on the mountain if they had food, shelter and places to nest. By the time 30 years had passed, all the animal species which had lived at Mount St. Helens before the eruption had returned. (SLIDE 10)

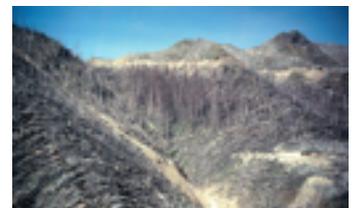
## PLANTS

Change:

The lateral blast that shot sideways from Mount St. Helens' flank at the summit, leveled the trees in an area 220 square miles. Six miles down from the summit, no trees were left. Beyond that, the trees were undressed of any needles, leaves and branches and were blown down and piled like pick up sticks. At the fringes of the blast area, the trees remained naked, thoroughly burnt but standing up. (SLIDE 11) The ash, (SLIDE 12) the lahars, (SLIDE 13) and the debris avalanche (SLIDE 14) covered most of the mountain. All was gray and barren. (SLIDE 15)

Seeds blow in the wind, especially in spring. When seeds land in a soft, fertile spot, they can sprout. It is a slow process at first, but then the landscape takes off. After 30 years, all the plant species which had lived at Mount St. Helens before the eruption, lived there again.

(SLIDES 16-17)



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# CHANGES! CHANGES! CHANGES!

**LIST WHAT CHANGES, IF ANY, A VOLCANIC ERUPTION WOULD CAUSE.**

**THINK ABOUT WHETHER THESE CHANGES WOULD BE LONG LASTING OR SHORT TERM.**

**WORK ON ANOTHER PAGE IF YOU NEED TO.**

<b>AIR</b>	
<b>WATER</b>	
<b>WEATHER</b>	
<b>SHAPE OF THE MOUNTAIN</b>	
<b>HEIGHT OF THE MOUNTAIN</b>	
<b>HABITATS</b>	
<b>ANIMALS</b>	
<b>PLANTS</b>	