

Gopher to the Rescue! A Volcano Recovery Story

By Terry Catasús Jennings

ABOUT THE BOOK



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.

To see the core standards to which *Gopher* is aligned, please visit: http://www.sylvandellpublishing.com/Standards_by_title.php?state=CR&t=114

Pre-Reading Discussion

Ask students to share what they know about volcanic eruptions and how they think the mountain will change—what will happen to ponds, and streams on the mountain, what will happen to the soil, how will plants and animals be affected? Discuss what kinds of plants and animals might survive and what they think plants and animals will need to live on the mountain after the eruption.



Discussion

Volcanoes normally give signs that an eruption is likely. What signs did Mount St. Helens give of its eruption in 1980? What do you think scientists did when they felt, saw and heard these signs? What do you think the authorities did? What would you do?

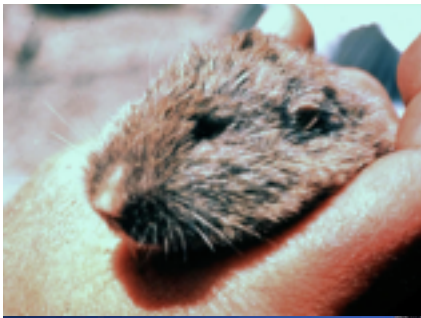
Animals felt the earth shake. Some saw steam and ash rise from the top of the mountain. What do you think animals did when they first felt the shaking? It was 59 days from the day of the first earthquake until the mountain fully erupted. How do you think the animals

reacted after a month of earthquakes? Have you ever been scared of something at first and then become used to it?

A volcano is a natural disaster. Which other natural disasters do you know about? Which of them give us warnings? Which of them can scientists track? Which give us no warning?

Some people stayed on the mountain even though they were told a volcano was about to erupt. They all died.

Why do you think you should follow the advice of authorities during a natural disaster?



Gophers survived the eruption. Which of gophers' habits made it possible? (largely nocturnal and lived in burrows underground)

Which of gophers' habits allowed them to continue to live on the mountain after the eruption? (underground burrows, roots and bulbs they eat were not damaged). What

things that animals need to live did gophers have? (food; shelter from the sun, to sleep and to hide from predators; places to nest)

What do you think happened to the water on the mountain after the eruption? (Streams were diverted, some ponds were filled in, others formed—there was still water on the mountain after the eruption.)

Before the eruption, fallen trees dotted the mountain. They were decomposing and they were the home for some small forest animals. During the eruption, these fallen trees protected the animals living in them. What animals survived in these fallen trees? Will they still be able to live on the mountain after the eruption, why or why not?

Salamander and toad polliwogs (larvae) survived in the ice and frozen mud in the bottom of ponds on the mountain. Would they have survived if the eruption had been in July and not in May? Why or why not?

Small islands of life survived the eruption. They surfed down the mountain on the avalanche. There were plants and perhaps small animals in these islands of life. What kind of animals do you think could live there? Do you think small animals could survive such a wild ride?

Plants spread from the islands of life that survived, from the seeds that took hold on gophers' tunnels, from seeds that fell on ground broken by elk's hooves, and from the undamaged area. Discuss whether you think the spread of plants was slow or fast. Why?

Lightweight seeds floated in on the wind. Could they take root if they landed on the hard, crusty ash? Why could seeds take root if they landed on gophers' tunnels?

Most plants get their nutrients from the ground. Gophers' tunnels with their rich soil, were excellent places for plants to take hold. But some plants get nutrients from the air (e.g. lupines). Which plants would do better at first: plants that get their nutrients from the air or plants that land in areas other than gophers' tunnels?

Seeds from coniferous trees—trees that reproduce using cones (pines, cedars, hemlocks, spruce)—are heavy. They depend on animals to spread them in their coats and in their poop. What kind of tree do you think has a better chance of colonizing the area damaged by the volcano—trees with lightweight seeds or coniferous trees?

The eruption happened in May. Trees around Mount St. Helens were beginning to set seeds. What do you think would have happened if the eruption had happened in late summer? In the winter?

What kind of animals could return to the mountain right away? Explain why you chose those animals. (insects fly in on the wind; elk and bear visited - they have long legs; birds flew over; snowshoe hares, squirrels, and other animals with short legs could not visit the devastated area, they remained in the undamaged fringes.)

Which animals could stay to live on the mountain right after the eruption? Why or why not? (Those that survived underground, or inside fallen trees, in the ponds—so long as they still had water, food, shelter, and places to nest.)

Birds could fly over the mountain right away. Explain what would allow birds to move back to the mountain or force them to stay in the undamaged areas. (There would be insects for birds to eat, but no berries, except, perhaps, in the small islands of life. The only places birds could find shade and places to hide from predators would be in the small islands of life. These small places would not support many animals. There would



be no trees for tree-nesting birds to nest. Ground-nesting birds would have to wait until there was enough brush to provide food and shelter and nesting places. Tree-nesting birds would have to wait many years for the trees to grow strong enough to support a nest.)

Predators follow their prey. For instance, eagles need birds and small mammals to feed on. Bobcats like to feed on squirrels, hares and other small mammals. Were predators able to come live on the mountain right away? (Would spend more energy looking for the sparse amount of food available than if they stayed on the undamaged fringes.)

When the weather became warmer, soon after the eruption, scientists saw something similar to a quaking mass of jelly covering a very large area. The quaking jelly turned out to be thousands of toads that had just hatched from larvae at the bottom of ponds. Why do you think there were so many toads? (lack of predators)

Seeds of deciduous trees like aspens, need sun to sprout. The trees need sun to live. The seeds of coniferous trees need shade to sprout. On Mount St. Helens, the seeds of coniferous trees took advantage of the shade of deciduous trees to sprout. But coniferous trees eventually grow taller than the deciduous trees and shade them from the sun. What do you think will happen to the deciduous trees? What do you call this process?

Recovery doesn't always move forward. At Mount St. Helens, elk ate many coniferous tree saplings. Can you remember a time when you were trying to accomplish something and something went wrong, but you finally accomplished it anyway?

Elk only like to eat coniferous trees. Where in a timeline do you think elk returned to the mountain to stay: at first, in the middle, or towards the end. Why?

WRITING ACTIVITIES

Are Gophers Heroes or Pests?

Gophers live in high meadows, like the slopes of Mount St. Helens; but they also live in farmers' fields. They eat the farmers' crops. Sometimes a farmer will find a hole where a carrot was the night before, or a corn plant that has fallen over because a gopher has eaten the plant's roots. Farmers don't like gophers. After scientists saw what happened at Mount St. Helens, they realized that in the long term, gophers can be beneficial. They can help plants grow better. Write a paragraph/essay on whether you think gophers are heroes or pests.

Follow Your Favorite Animal Through the Recovery

Some animals survived the eruption. Some, like gopher, survived right on the mountain. Some were able to flee to the neighboring, undamaged, forests. Choose an animal and write about what may have happened to that type of animal during and right after the eruption and during the recovery. Consider what the animal needs to survive and when that would be available again on the mountain.

Animals you could choose : Elk, bear, snowshoe hare, ground squirrels, flying squirrels, chipmunks, ground-nesting bird (American pippin or horned lark), tree-nesting birds, woodpeckers, hawks, eagles, bobcats.

MORE INFORMATION:

From Sylvan Dell Publishers:

For Creative Minds: http://www.sylvandellpublishing.com/ForCreativeMinds/GopherRescue_FCM.pdf

Teaching Activities Guide: http://www.sylvandellpublishing.com/documents/TeachingActivities/GopherRescue_TA.pdf

Quizzes: http://www.sylvandellpublishing.com/quize.php?title_id=114&q_type=1; http://www.sylvandellpublishing.com/quize.php?title_id=114&q_type=2; http://www.sylvandellpublishing.com/quize.php?title_id=114&q_type=3

For Images on Animal Recovery:

<http://www.fs.fed.us/pnw/mtsthelens/photo-gallery/index.shtml>

For Volcano Images:

http://volcanoes.usgs.gov/volcanoes/st_helens/st_helens_gallery_23.html